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SOIL SURVEY

Pierce County, Georgia



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

Major fieldwork for this soil survey was done in the period 1960-1964. Soil names and descriptions were approved in 1965. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1965. This survey was made cooperatively by the Soil Conservation Service and the University of Georgia, College of Agriculture, Agricultural Experiment Stations, as part of the technical assistance furnished to the Satilla River Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Pierce County contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in appraising the suitability of tracts of land for agriculture, industry, or recreation.

Locating Soils

All of the soils of Pierce County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the survey. This guide lists all of the soils of the county in alphabetic order by map symbol. It shows the page where each kind of soil is described, and also the page for the woodland group, wildlife group, or any other group in which the soil has been placed.

Individual colored maps showing the relative suitability or limitations of soils for many specific purposes can be developed by using the soil map and information in the text. Interpretations not included in the text can be developed by grouping the soils according to their suitability or limitations for a particular use. Translucent material can be used as an overlay over

the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions.

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others concerned with wildlife can find information about soils and wildlife in the section "Use of the Soils for Wildlife."

Community planners and others concerned with suburban development can read about the soil properties that affect the choice of homesites, industrial sites, and recreation sites in the section "Use of the Soils for Selected Nonfarm Purposes."

Engineers and builders can find under "Use of the Soils for Engineering" tables that give engineering descriptions of the soils in the county and that name soil features that affect engineering practices and structures.

Scientists and others can read about how the soils were formed and how they are classified in the section "Formation and Classification of Soils."

Newcomers in Pierce County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County," which gives additional information about the county.

Cover picture: In foreground, Coastal bermudagrass, cut for hay, and tobacco growing on Tifton loamy sand, 0 to 2 percent slopes, class I land. In background, pines growing on Leefield sand, 0 to 2 percent slopes, class II land.

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I

SOIL SURVEY OF PIERCE COUNTY, GEORGIA

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

PIERCE COUNTY is in the southeastern part of Georgia (fig. 1), in the Atlantic Coast Flatwoods Major Land Resource Area. The land area of 218,880 acres is bounded on the south by the Satilla River, on the northeast by Big Satilla Creek, and on the east by the Little Satilla River. The soils are mostly level, although there are some very gently sloping soils and a few undulating soils on the uplands. They are mainly loamy sand or sand and, as a whole, are well suited to farming. The climate is favorable for most crops because of the long growing season and the mild winters.

Farming is the major source of income in the county. Tobacco and corn are the principal crops. Pulpwood and turpentine are valuable products of the forests, which cover a large part of the county.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Pierce County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide uniform procedures. To use this survey efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series (7)¹. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Tifton and Fuquay, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the natural, undisturbed landscape. Soils of one series can differ somewhat in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Albany sand and Albany loamy fine sand are two soil types in the Albany series.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or in some other feature affect-

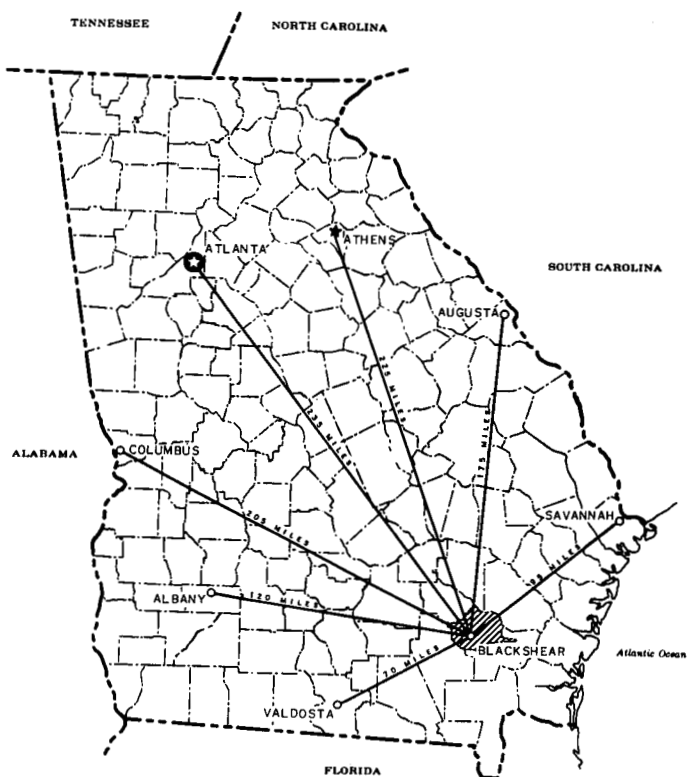


Figure 1.—Location of Pierce County in Georgia.

¹ Italic numbers in parentheses refer to Literature Cited, p. 41.

ing their use that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases. The name of a soil phase indicates a feature that affects management. For example, Tifton loamy sand, 2 to 5 percent slopes, is one of two phases of Tifton loamy sand, a soil type that is level or nearly level to gently sloping.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this survey was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

Another kind of mapping unit is the undifferentiated group, which consists of two or more soils that may occur together without regularity in pattern or relative proportion. The individual tracts of the component soils could be shown separately on the map, but the differences between the soils are so slight that the separation is not important for the objectives of the soil survey. An example is Osier soils and Alluvial land.

Also, on most maps, areas are shown that are so wet or so frequently worked by water that they cannot be classified by soil series. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Swamp or Alluvial land, and are called land types rather than soils.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the soil map and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in this soil survey. On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. Then, they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

After studying the soils in a locality and their relative positions on the landscape, it is possible to make a map that shows the location of general patterns of soils, or soil associations. Such a map is the small-scale, colored map that is bound in the back of this survey. Each association contains, as a rule, two or more major soils and several other soils of lesser extent, in a pattern that is not necessarily uniform but is generally repeated on the landscape.

The general soil map does not show the kind of soil at any particular place, and it is not a suitable reference for planning the use or treatment of the soils in a particular field or on a particular farm. It is useful to those who need only a general idea of the soils in this county, those who want to compare different parts of the county, and those who want an idea of the extent of the different kinds of soils.

Each of the seven soil associations delineated on the general soil map for Pierce County is identified in the legend by the name of the two or three dominant soil series and by a short description of some important features of these dominant soils. For example, in association 3, the Tifton, Irvington, and Robertsdale soils are the most extensive. In the legend for the general soil map, association 3 is named as "Tifton-Irvington-Robertsdale association: Nearly level to gently sloping, moderately well drained, well drained, and somewhat poorly drained soils on uplands." The soils of this association are in other associations, but in different patterns. Soils other than the Tifton, Irvington, and Robertsdale soils are in association 3, but are less extensive. These less extensive soils are neither named nor described in the legend, but they are discussed in the interpretations of the general soil map.

1. Leefield-Robertsdale-Pelham association

Somewhat poorly drained and poorly drained soils on low uplands, on broad flats, and in slight depressions

This association consists of low, nearly level uplands; broad flats; and ponded depressions. It occupies about 32 percent of the county and occurs mainly in the southwestern, north-central, and eastern parts.

The Leefield soils make up about 30 percent of this association, the Robertsdale soils about 30 percent, and the Pelham soils about 10 percent. The Leefield and Robertsdale soils are on low uplands and are somewhat poorly drained. The Leefield soils have a surface layer of very dark grayish-brown sand. This layer is underlain by mottled pale-yellow sand to a depth of 20 to 40 inches. Below this is sandy clay loam. The Robertsdale soils have a surface layer of gray loamy sand and a mottled pale-yellow subsoil that is underlain by a weakly developed fragipan. The Pelham soils are on broad flats and in slight depressions and are poorly drained. The uppermost 36 inches is gray sand. The subsoil is gray to pale-brown sandy loam to sandy clay loam.

The rest of this association, or about 30 percent, is made up of minor soils. The moderately well drained Irvington and Stilson soils, the somewhat poorly drained Albany soils, and the poorly drained Mascotte soils are on uplands. The very poorly drained Rutlege and Portsmouth soils are in ponded areas, in depressions, and along intermittent

drainageways. Small areas of Osier soils and of Alluvial land are along some intermittent drainageways.

About 70 percent of this association consists of soils that respond well to fertilization, drainage, and other good management. These soils are used extensively for tobacco and corn but are also well suited to pasture and trees. The rest of this association consists of poorly drained or very poorly drained soils that are not suited to cultivated crops. Nearly all of this acreage is wooded.

Because of a seasonal high water table, much of this association has severe limitations if used for dwellings with septic tanks, for industrial sites, or for such recreational uses as campsites and intensive play areas.

2. Pelham-Portsmouth-Mascotte association

Poorly drained and very poorly drained soils on low broad flats, in drainageways and ponded depressions, and on low uplands

This association consists of ponded depressions, drainageways, broad flats, and low ridges. It occupies about 18 percent of the county. One large area covers much of the eastern part. A small area is in the northwestern part.

The Pelham soils make up about 30 percent of this association, the Portsmouth soils about 30 percent, and the Mascotte soils about 15 percent. The Pelham soils are on broad flats or in slight depressions and are poorly drained. Their surface layer of dark-gray sand is underlain to a depth of 20 to 40 inches by gray sand. The lower subsoil is sandy clay loam. The Portsmouth soils are in drainageways and depressions and are very poorly drained. They have a thick surface layer of black loam and a subsoil of mottled grayish-brown sandy clay. Both the Pelham and the Portsmouth soils are flooded during wet periods. The Mascotte soils are on low, nearly level uplands and are poorly drained. The uppermost 36 to 48 inches is mainly sand. A thin organic layer occurs at a depth of about 16 inches. The lower part of the solum is gray sandy clay loam.

The remaining 25 percent of this association is made up of the Albany, Leefield, Robertsdale, Rutlege, and other minor soils. The somewhat poorly drained Albany soils are on low, level uplands and around depressions; the somewhat poorly drained Leefield and Robertsdale soils are on low uplands; and the very poorly drained Rutlege soils are in drainageways and depressions.

Because of wetness, the soils of this association generally are not suited to cultivation. Practically all of the acreage is wooded. The vegetation consists principally of slash pine, cypress, gum, bay, and pond pine and a thick understory of waxmyrtle, titi, and other water-tolerant plants. The Mascotte soils have a dense cover of palmetto, gallberry, and runner oak. This association is suited to trees and can be made better suited by the removal of excess water.

Because of wetness, most of this association has severe limitations if used for dwellings with septic tanks, for industrial sites, or for such recreational uses as campsites and intensive play areas.

3. Tifton-Irvington-Robertsdale association

Nearly level to gently sloping, moderately well drained, well drained, and somewhat poorly drained soils on uplands

This association is made up of nearly level to gently

sloping uplands that are dissected by small, intermittent streams. It occurs in the northern part of the county south of Big Satilla Creek and is on both sides of the Alabama River. It occupies about 17 percent of the county.

The Tifton soils make up about 30 percent of this association, the Irvington soils about 25 percent, and the Robertsdale soils about 15 percent. The Tifton soils are on the higher lying uplands and are well drained. They have a surface layer of dark grayish-brown loamy sand and a subsoil of yellowish-brown sandy clay loam. The Irvington soils resemble the Tifton soils and commonly adjoin them, but they are at lower elevations and are moderately well drained. They have a weakly cemented layer at a depth of 20 to 36 inches. The Robertsdale soils are at slightly lower elevations than the Irvington and are somewhat poorly drained. They also have a weakly cemented layer at a depth of 20 to 36 inches.

Minor soils, which make up about 30 percent of this association, include the well drained Fuquay and Carnegie soils on high uplands, the moderately well drained Chipley soils and the somewhat poorly drained Leefield and Albany soils on low uplands, the poorly drained Pelham soils along intermittent streams or in ponded depressions, and the Osier soils and Alluvial land along intermittent stream channels.

About 80 percent of this association consists of some of the best farming soils in the county. These soils are well suited to tobacco, cotton, and corn. They are also well suited to pasture and trees. About 20 percent of this association consists of somewhat poorly drained and poorly drained soils that are not suited to cultivated crops. Nearly all of this acreage is wooded.

The well-drained soils have only slight limitations if used for dwellings with septic tanks, for industrial sites, or for such recreational uses as campsites and intensive play areas. The moderately well drained and poorly drained soils have moderate limitations for such use.

4. Lumbee-Swamp association

Poorly drained soils subject to flooding, and swamps

This association consists of low, level flood plains of the Satilla, Alabama, and Little Satilla Rivers and Big Satilla Creek. It makes up about 9 percent of the county.

The Lumbee soils make up about 48 percent of this association, and Swamp makes up about 12 percent. The Lumbee soils are poorly drained and are frequently flooded. They have a surface layer of black fine sandy loam and a subsoil of mottled gray sandy clay to sandy clay loam. Swamp is very poorly drained and is flooded a greater part of each year. The surface layer is black and ranges from sand to silt. The subsoil consists of stratified layers of sand, silt, and sandy clay mixed with various amounts of organic matter.

The rest of this association, or about 40 percent, is made up of the somewhat poorly drained Albany and Dunbar soils, the poorly drained Osier soils, other soils, and Alluvial land.

This association is frequently flooded. Consequently, it is not suited to either cultivated crops or pasture. Most of the acreage is in mixed stands of hardwoods and pine. The Lumbee and Albany soils are well suited to pine. Swamp is better suited to hardwoods.

Nearly all of this association is considered to have severe limitations if used for dwellings with septic tanks, for industrial sites, or for such recreational use as intensive play areas.

5. Lakeland-Kershaw-Chipley association

Excessively drained sandy soils on upland ridges, and moderately well drained sandy soils on low uplands

This association is made up of undulating to nearly level ridges dissected by small intermittent streams. It makes up about 7 percent of the county and occurs along both the Satilla and the Alabama Rivers.

The Lakeland soils occupy about 50 percent of this association, the Kershaw soils about 25 percent, and the Chipley soils about 20 percent. The Lakeland and Kershaw soils are at the highest elevations in the association. The Lakeland soils have a very dark gray sandy surface layer and a subsoil of light olive-brown to yellowish-brown sand. The Kershaw soils have a surface layer of very dark grayish-brown coarse sand and a subsoil of yellowish-brown to strong-brown sand. The Chipley soils are adjacent to the Lakeland but are at slightly lower elevations. Their surface layer is dark grayish-brown sand, and their subsoil is mottled pale-yellow sand.

The remaining 5 percent of this association consists of the poorly drained Mascotte soils on toe slopes, the very poorly drained Rutlege soils in intermittent drainageways, the poorly drained Pelham soils at the head of draws or drainageways, the somewhat poorly drained Albany soils on toe slopes and at the head of drainageways, and the poorly drained Osier soils and Alluvial land in intermittent drainageways.

Much of the acreage is droughty and is poorly suited to cultivated crops. The Chipley soils have a fluctuating water table but are droughty in summer.

This association has moderate to severe limitations when used for dwellings with septic tanks, for industrial sites, or for such recreational uses as campsites and intensive play areas.

6. Irvington-Robertsdale-Leefield association

Nearly level to gently sloping, moderately well drained and somewhat poorly drained soils on uplands

This association is on nearly level to gently sloping uplands and is dissected by small intermittent streams. It makes up about 8 percent of the county and occurs in the extreme southern part and in the northern and northeastern parts.

The Irvington soils make up about 40 percent of this association, the Robertsdale soils about 30 percent, and the Leefield soils about 20 percent. The Irvington soils are at the higher elevations and are moderately well drained. Their subsoil is mottled yellowish-brown sandy clay loam. A weakly cemented layer occurs at a depth of 20 to 36 inches. The Robertsdale and Leefield soils are at slightly lower elevations than the Irvington and are somewhat poorly drained. The Robertsdale soils have a subsoil of pale-yellow sandy clay loam, and there is a weakly cemented layer at a depth of 20 to 36 inches. The Leefield soils have a subsoil of light-gray sandy clay loam mottled with yellowish brown, red, and yellow. The water table in the Irvington soils is between a depth of 15 and 30 inches

for 2 to 6 months each year. In the Robertsdale and Leefield soils, the water table is between a depth of 15 and 30 inches for more than 6 months each year.

The minor soils, which make up about 10 percent of this association, include the well drained Tifton soils on the higher lying uplands, the moderately well drained Chipley soils and the somewhat poorly drained Albany soils on low uplands, and the poorly drained Pelham soils along intermittent stream channels and in ponded depressions. The Osier soils and Alluvial land occur in some intermittent stream channels.

About 90 percent of this association consists of some of the best farming soils in the county. These soils are well suited to tobacco, cotton, and corn and are also well suited to pasture and trees. They respond well to good management. The rest of this association consists of soils that are not suited to cultivated crops. Nearly all of this acreage is wooded.

The dominant soils of this association are considered to have severe limitations for dwellings served by septic tanks and moderate limitations for industrial sites and such recreational uses as campsites and intensive play areas.

7. Pelham-Leefield-Albany association

Poorly drained and somewhat poorly drained soils that have a high water table for long periods; on low broad flats, in slight depressions, and on low uplands

This soil association is on nearly level low uplands and broad flats. It makes up about 9 percent of the county and occurs mainly in the central and southwestern parts.

The Pelham soils make up about 35 percent of this association, the Leefield soils about 20 percent, and the Albany about 15 percent. The Pelham soils are on broad flats and in slight depressions and are poorly drained. They have a surface layer of gray to dark-gray sand and a subsoil of mottled gray to brownish-yellow sandy clay loam. The Leefield and Albany soils are somewhat poorly drained. They have a thick surface layer of gray or dark-gray sand and a subsoil of brownish-yellow to pale-brown mottled sandy loam to sandy clay loam. The Pelham soils have a water table within 15 inches of the surface for more than 6 months each year, and many areas are flooded more often than once each year for periods of more than a month. The water table in the Leefield soils is at a depth between 15 and 30 inches for more than 6 months each year. The Albany soils have a fluctuating water table that is at or within 15 inches of the surface 2 to 6 months each year.

The remaining 30 percent of this association consists of the moderately well drained Irvington soils on uplands, the somewhat poorly drained Robertsdale soils and the poorly drained Mascotte soils on low uplands, and the very poorly drained Portsmouth and Rutlege soils in depressions and along drainageways.

Little of this association is cultivated. Most of the acreage is in woodland consisting principally of pines and some hardwoods. About 20 percent of the acreage is suited to moderate cultivation, and about 35 percent is suited to pasture. The soils are well suited to pine.

Because of the seasonal high water table, most of this association is considered to have severe limitations for dwellings having septic tanks, for industrial sites, or for such recreational uses as campsites and intensive play areas.

Descriptions of the Soils²

This section describes in detail the soil series in the county and the mapping units of each series.

Each series description contains a description of a soil profile that is considered typical of the mapping units in the series. Following each series description are descriptions of the mapping units in the series. If the profile of any given mapping unit differs from that of the typical profile, these differences are stated unless they are apparent in the soil name.

For full information on any one mapping unit, it is necessary to read both the description of the unit and that of the series to which the mapping unit belongs. The symbol in parentheses following the name of the mapping unit identifies that unit on the soil map at the back of this survey.

Many of the technical terms used in this section, for example, structure, horizon, and fragipan, are defined in the Glossary. The acreage and proportionate extent of the mapping units are shown in table 1.

TABLE 1.—Approximate acreage and proportionate extent of soils

Soils	Area	Extent
	<i>Acres</i>	<i>Percent</i>
Albany loamy fine sand, 0 to 2 percent slopes...	1,300	0.6
Albany sand, 0 to 2 percent slopes.....	2,500	1.1
Carnegie sandy loam, 2 to 5 percent slopes, eroded.....	425	.2
Carnegie sandy loam, 5 to 8 percent slopes, eroded.....	530	.2
Chipley sand, 0 to 2 percent slopes.....	8,485	3.9
Dunbar fine sandy loam, 0 to 2 percent slopes.....	850	.4
Fuquay loamy sand, 0 to 2 percent slopes.....	1,080	.5
Irvington loamy sand, 0 to 2 percent slopes.....	24,645	11.2
Kershaw coarse sand, 0 to 5 percent slopes.....	6,335	2.9
Lakeland sand, 0 to 5 percent slopes.....	10,405	4.8
Leefield sand, 0 to 2 percent slopes.....	30,275	13.8
Lumbee fine sandy loam.....	10,460	4.8
Mascotte sand.....	8,350	3.8
Osier soils and Alluvial land.....	6,240	2.9
Pelham sand, 0 to 2 percent slopes.....	26,150	11.9
Portsmouth loam.....	18,800	8.6
Robertsdale loamy sand, 0 to 2 percent slopes.....	37,320	17.1
Rutlege sand.....	1,500	.7
Stilson loamy sand, 0 to 2 percent slopes.....	4,290	2.0
Swamp.....	2,720	1.2
Tifton loamy sand, 0 to 2 percent slopes.....	9,870	4.5
Tifton loamy sand, 2 to 5 percent slopes.....	6,350	2.9
Total.....	218,880	100.0

The "Guide to Mapping Units" at the back of this survey lists all of the mapping units in the county and shows the woodland suitability group, woodland grazing group, and wildlife suitability group of each. The page where each of these groups is described is also given.

Albany Series

The Albany series consists of somewhat poorly drained, level or nearly level soils that formed in deposits of marine sand. These soils occur in small areas throughout

the county but are mainly in the western part. They are low in natural fertility and are very strongly acid. Run-off is slow, and permeability is rapid. The available water capacity is low in the upper horizons, but for about 2 to 6 months each year the water table fluctuates within 15 inches of the surface.

These soils commonly occur with the Lee field, Mascotte, and Pelham soils. They differ from the Lee field in that they have little or no plinthite in their lower horizons. They lack the leached A2 horizon and the very dark grayish-brown B2h horizon that is typical of the Mascotte soils, and they are better drained and have a less gray subsoil than the Pelham soils.

Only a few small areas of the Albany soils are used for crops or pasture. Most of the acreage is wooded. The natural vegetation consists mainly of slash pine, longleaf pine, oak, palmetto, gallberry, and waxmyrtle.

Representative profile of Albany sand, 0 to 2 percent slopes, in a wooded area 1¾ miles northeast of Rehobeth Church.

A11—0 to 6 inches, dark-gray (N 4/0) sand; weak, fine, granular structure; very friable; clean sand grains; many fine roots; very strongly acid; abrupt, wavy boundary.

A12—6 to 12 inches, very dark grayish-brown (10YR 3/2) sand; moderate, fine, granular structure; friable; some organic matter; extremely acid; abrupt, wavy boundary.

A21—12 to 26 inches, very pale brown (10YR 7/3) sand; few, fine, faint, yellow mottles; weak, fine, granular structure; very strongly acid; gradual, wavy boundary.

A22—26 to 44 inches, white (2.5Y 8/2) sand; weak, fine, granular structure; very friable; very strongly acid; abrupt, wavy boundary.

B21t—44 to 54 inches, brownish-yellow (10YR 6/8) sandy loam; few, fine, faint, light-gray mottles; weak, fine, subangular blocky structure; friable; very strongly acid; clear, wavy boundary.

B22t—54 to 67 inches +, light-gray (2.5Y 7/2) sandy loam; few, fine, faint, yellow mottles; weak, fine, subangular blocky structure; friable; very strongly acid.

The A11 horizon ranges from gray to very dark gray. The A12 horizon ranges from 4 to 6 inches in thickness and from gray to very dark grayish brown in color. The A2 horizon is mottled white or light-gray to very pale brown sand. Light-gray, pale-yellow, yellowish-brown, or brownish-yellow sandy loam or sandy clay loam is at a depth of 36 to 48 inches.

Albany loamy fine sand, 0 to 2 percent slopes (AsA).—This soil is on low terraces along the Alabama, Satilla, and Little Satilla Rivers. It is flooded often in winter and in spring. The surface layer of dark-gray loamy fine sand is about 3 inches thick. It is underlain to a depth of about 4 feet by grayish-brown to pale-yellow fine sand. The lower part of the subsoil is light-gray sandy loam or sandy clay loam mottled with shades of yellow and brown. Most of this soil is wooded. The natural vegetation consists mainly of slash pine, longleaf pine, palmetto, sweetgum, and oak.

Because of the frequency of flooding, this soil is not suited to cultivated crops or pasture. The water table is within 15 inches of the surface for 2 to 6 months each year. This soil provides excellent habitats for wildlife. (Capability unit IVw-4; woodland group 6; woodland grazing group 6; wildlife group 3)

Albany sand, 0 to 2 percent slopes (AdA).—The surface layer of this soil is dark-gray to very dark grayish-brown sand and is about 12 inches thick. It is underlain to a depth of about 45 inches by very pale brown to light-gray or

²J. N. NASH, conservation agronomist, Soil Conservation Service, supplied information concerning management of the soils for crops and pasture.

white sand. Between a depth of about 45 and 67 inches, the subsoil is brownish-yellow to light-gray sandy loam.

This soil has a high water table, but it becomes dry late in spring and in summer. Consequently, it is suited to only a few kinds of crops. If adequately drained, fertilized, and otherwise well managed, it is suited to tobacco, corn, small grain, bahiagrass, and Coastal bermudagrass. Lupine, crotalaria, and velvetbeans are suitable legumes. (**Crotalaria is poisonous to some animals.**) Pine trees are well suited.

This soil can be used for row crops year after year without soil loss, but it is more productive if a good cropping system is used. An example of a suitable cropping system is 1 year of tobacco followed by 2 years of perennial sod.

Organic matter is depleted at a moderate rate, even if management is good. If the cropping system does not include perennials, then all residues should be turned under just prior to the planting of the next crop. This practice helps to maintain good tilth and to increase the water-holding capacity. Drainage is necessary if crops are grown.

This soil responds well to fertilization but is readily leached of plant nutrients. (Capability unit IIIw-1; woodland group 6; woodland grazing group 6; wildlife group 3)

Alluvial Land

Alluvial land formed in highly stratified deposits consisting mainly of sand, silt, and various amounts of organic material. The areas are between 150 and 300 feet wide. Small meandering streams flow slowly through these areas.

This land is poorly drained and is flooded frequently in winter and in spring. It is low in natural fertility, low to medium in organic-matter content, and very strongly acid. The surface layer ranges from light gray to black in color and from sand to mucky loam in texture. In Pierce County, Alluvial land is mapped only as an undifferentiated mapping unit with the Osier soils.

Carnegie Series

The Carnegie series consists of well-drained, pebbly soils that formed in old marine deposits of sandy clay and sandy clay loam on uplands. These soils are on slope breaks, mainly in the northern part of the county. They are low in organic-matter content and are very strongly acid. Permeability is moderate, and the available water capacity is medium. There is plinthite in the lower part of the solum.

These soils commonly occur with the Irvington, Lakeland, Stilson, and Tifton soils. They differ from the Irvington soils in that their subsoil tends to be redder, and they lack a fragipan. They are finer textured throughout the solum than the Lakeland soils. They lack the thick sandy surface layer that is characteristic of the Stilson soils and are better drained. The upper part of the solum that is without an appreciable amount of plinthite is thinner than that of the Tifton soils.

The Carnegie soils are not important for farming. If well managed, they can be used for cultivated crops. They are moderately well suited to pasture and are well suited to pine trees.

Representative profile of Carnegie sandy loam, 5 to 8 percent slopes, eroded, in a cultivated field 1¼ miles generally north of Shady Grove Baptist Church on Georgia Highway No. 203, then half a mile west, on north side of dirt road.

Apen—0 to 6 inches, dark-brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; many, small, hard iron concretions; few fine roots; very strongly acid.

B1tcn—6 to 16 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, fine, subangular blocky structure; firm; common iron concretions; very strongly acid; abrupt, wavy boundary.

B2tcn—16 to 23 inches, yellowish-brown (10YR 5/8) sandy clay; few, fine, prominent, dark-red mottles; moderate, fine, subangular blocky structure; firm; few iron concretions; few quartz grains; very strongly acid; clear, wavy boundary.

B3t—23 to 44 inches, reticulately mottled yellowish-brown (10YR 5/8), brownish-yellow (10YR 6/8), and dark-red (10R 3/6) sandy clay loam; structureless; friable; very strongly acid; gradual, wavy boundary.

C1—44 to 54 inches, reticulately mottled brownish-yellow (10YR 6/8), light-gray (10YR 7/1), and red (10R 4/8) coarse sandy loam; structureless; friable to firm; very strongly acid; gradual, wavy boundary.

C2—54 to 60 inches +, reticulately mottled reddish-yellow (5YR 6/8), red (2.5YR 4/8), and olive-yellow (2.5Y 6/8) coarse sandy loam; structureless; friable; very strongly acid.

The Apen horizon ranges from dark brown to very dark grayish brown in color and from 5 to 8 inches in thickness. The B2tcn horizon ranges from yellowish brown to yellowish red in color and from sandy clay loam to sandy clay in texture. In some places there are few iron concretions on the surface and throughout the profile, and in other places there are many.

Carnegie sandy loam, 2 to 5 percent slopes, eroded (CoB2).—The surface layer of this soil is dark-brown to very dark grayish-brown sandy loam and is 5 to 8 inches thick. Normally, about 15 percent of this layer consists of iron concretions. The subsoil ranges from yellowish-brown to yellowish-red sandy clay to sandy clay loam and contains many hard and soft concretions. Many rills have formed, and a few shallow gullies. In some cultivated areas the present surface layer is a mixture of the original surface soil and material from the upper part of the subsoil.

This soil is suited to only a few kinds of crops. Corn, cotton, and sorghum grow fairly well if management is good. Oats and rye are suitable small grains, and Coastal bermudagrass and bahiagrass are suitable pasture grasses. Pine trees grow well.

Runoff is medium to rapid; consequently, erosion is a moderate to severe hazard in cultivated fields. Measures that help to control erosion are contour farming, terracing, and stripcropping, practiced with a cropping system that includes annual close-growing crops, perennial crops, or crops that produce a large amount of residue. An example of a suitable cropping system for a field that is terraced and farmed on the contour is 4 years of perennial grass followed by 2 years of cotton.

Organic matter is depleted at a moderately rapid rate, even if management is good. Turning under crop residues and including a cover crop in the rotation are ways to maintain good tilth and to increase the available moisture capacity.

The response to fertilization is good if moisture conditions are favorable, but during prolonged dry periods there is not sufficient moisture in the soil for fertilizer to be helpful.

This soil is not well suited to irrigation, because of its fine-textured subsoil and the plinthite layer in the lower part of the solum. Nevertheless, row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. (Capability unit IIIe-4; woodland group 1; woodland grazing group 1; wildlife group 5)

Carnegie sandy loam, 5 to 8 percent slopes, eroded (CoC2).—The surface layer of this soil is predominantly dark-brown to very dark grayish-brown sandy loam and is about 5 inches thick. The subsoil is yellowish-brown to yellowish-red sandy clay loam to sandy clay. Shallow gullies have formed in a few places. Included in the areas mapped are small areas in which the surface layer is loamy sand. Also included are small patches of soils that are so severely eroded that in places the yellowish-brown subsoil is exposed.

Runoff is rapid, and erosion is a hazard in cultivated fields. Only a few kinds of crops can be grown. Corn and cotton can be grown in a suitable cropping system. Oats and rye are fairly well suited small grains, and Coastal bermudagrass and bahiagrass are well-suited pasture grasses. Pine trees grow well.

Measures that help to control erosion are contour farming, terracing, and stripcropping. These are practiced with a cropping system that includes perennial crops or annual close-growing crops that produce a large amount of residue. For example, in a field that is terraced and farmed on the contour, strips of perennial grass can be alternated with strips of corn, arranged so that the sequence is 4 years of grass and 2 years of corn.

Organic matter is depleted rapidly, even if management is good. Turning under crop residues and green-manure crops and using a rotation that includes close-growing crops are ways to maintain good tilth and to increase the available moisture capacity.

The response to fertilization is good if moisture conditions are favorable, but during prolonged dry periods there is not enough moisture in the soil for fertilizer to be helpful.

This soil is not well suited to irrigation. (Capability unit IVe-4; woodland group 1; woodland grazing group 1; wildlife group 5)

Chipley Series

The Chipley series consists of moderately well drained soils that formed in beds of sand and sandy clay loam on low uplands throughout the county. The largest acreage is in the western half. These soils are low in natural fertility, low in organic-matter content, and very strongly acid. The available water capacity is low, but during wet periods the soils are saturated because of the moderately high water table. Permeability is rapid.

The Chipley soils commonly occur with the Leefield, Lakeland, Pelham, and Albany soils. They are sandy to a greater depth than the Leefield and Albany soils. They are less well drained than the Lakeland soils and not so wet and gray as the Pelham.

The Chipley soils are suited to most of the crops commonly grown in the county. The natural vegetation consists mainly of slash pine, longleaf pine, oak, gallberry, waxmyrtle, palmetto, and wiregrass.

Representative profile of Chipley sand, 0 to 2 percent slopes, about $\frac{3}{4}$ mile generally west of Prospect Church

along paved road, then $1\frac{3}{4}$ miles southwest along dirt road, on north side of road.

A1—0 to 8 inches, dark grayish-brown (10YR 4/2) sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; clear, wavy boundary.

AC—8 to 21 inches, pale-brown (10YR 6/3) sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; gradual, wavy boundary.

C1g—21 to 34 inches, pale-yellow (2.5Y 7/4) sand; few, fine, faint mottles of light gray; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.

C2g—34 to 65 inches +, pale-yellow (5Y 7/3 or 2.5Y 7/4) sand; common, fine, faint mottles of light gray; weak, fine, granular structure; very friable; very strongly acid.

The A1 horizon ranges from gray to dark grayish brown in color. The C horizon ranges from pale olive to light yellowish brown and is mottled with light gray.

Chipley sand, 0 to 2 percent slopes (CmA).—The surface layer of this soil is predominantly gray to dark grayish-brown sand and is about 8 inches thick. It is underlain to a depth of several feet by pale-brown to light yellowish-brown sand. Included in the areas mapped are small areas in which the surface layer is fine sand and some areas in which the subsoil is mottled yellowish-brown and gray sandy clay loam. Most of the areas mapped contain small areas of soils that are similar to the Chipley but are somewhat poorly drained.

This soil is limited in its suitability for crops by a fluctuating water table. Also, it tends to become dry late in spring and in summer. Most cleared areas are in pasture. If this soil is drained, fertilized, and otherwise well managed, it can be used for tobacco, corn, small grain, bahiagrass, and Coastal bermudagrass. Lupine, crotalaria and velvetbeans are suitable legumes. Pine trees grow well.

Row crops can be grown year after year without soil loss, but yields are better if a good cropping system is used. An example of a suitable cropping system is 1 year of tobacco followed by 2 years of perennial sod.

Organic matter is depleted at a moderate rate, even if management is good. If the cropping system does not include perennials, then all residues should be turned under just prior to the planting of the next crop. This practice helps to maintain good tilth and to increase the water-holding capacity. Drainage is necessary if crops are grown.

The response to fertilization is good, but plant nutrients are readily leached from this soil. (Capability unit IIIw-1; woodland group 6; woodland grazing group 6; wildlife group 3)

Dunbar Series

The Dunbar series consists of somewhat poorly drained soils that formed in fluvial deposits along the Satilla, Alabama, and Little Satilla Rivers. These soils have good tilth and a deep root zone, but they are low in organic-matter content, low in natural fertility, and very strongly acid. The available water capacity is moderately high. Permeability is moderate in the upper part of the profile but slow in the lower part. Runoff is slow.

The Dunbar soils commonly occur with the Albany and Lumbee soils. They are finer textured throughout than the Albany soils and are better drained and not so gray as the Lumbee.

The Dunbar soils in the county are not important to farming. Most of the acreage is wooded. The natural vegetation is slash pine, longleaf pine, palmetto, sweetgum, waxmyrtle, and wiregrass.

Representative profile of Dunbar fine sandy loam, 0 to 2 percent slopes, in a wooded area $1\frac{1}{4}$ miles southeast of River Bridge on U.S. Highway No. 82, near the Satilla River.

A11—0 to 3 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; friable; numerous roots; very strongly acid; abrupt, wavy boundary.

A12—3 to 7 inches, grayish-brown (10YR 5/2) fine sandy loam; weak, fine, granular structure; friable; many roots; very strongly acid; abrupt, wavy boundary.

A2—7 to 14 inches, light olive-brown (2.5Y 5/4) fine sandy loam; common, fine, distinct mottles of light gray and brownish yellow; weak, fine, granular structure; friable; few fine roots; many pore spaces and old root holes; very strongly acid; clear, wavy boundary.

B1tg—14 to 18 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, fine, distinct mottles of gray and strong brown; weak, fine, subangular blocky structure; firm; few fine roots; very strongly acid; clear, wavy boundary.

B21tg—18 to 26 inches, reticulately mottled gray (10YR 5/1), light-gray (10YR 6/1), red (2.5YR 4/6), and light olive-brown (2.5Y 5/4) clay; strong, fine, subangular blocky structure; very firm; very strongly acid; clear, wavy boundary.

B22tg—26 to 36 inches, reticulately mottled yellowish-brown (10YR 5/8), red (2.5YR 4/6), and light-gray (10YR 6/1) sandy clay; moderate, fine, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.

B3t—36 to 54 inches +, reticulately mottled yellowish-brown (10YR 5/8), red (2.5YR 4/6), and light-gray (10YR 6/1) sandy clay loam; weak, fine, subangular blocky structure; firm; sand lenses; very strongly acid.

The A11 and A12 horizons range from dark-gray to dark grayish-brown fine sandy loam. The B2 horizon ranges from sandy clay loam to clay. The depth to reticulately mottled material ranges from 15 to 22 inches. Sandy clay loam stratified with lenses of sand occurs at a depth of 32 to 46 inches.

Dunbar fine sandy loam, 0 to 2 percent slopes (DmA).—

This soil is on flood plains. The surface layer is dark-gray to dark grayish-brown fine sandy loam. The subsoil is mottled brown, yellow, gray, and red sandy clay to clay. Included in the areas mapped are small areas in which the surface layer is loamy sand and some areas in which sandy loam occurs at a depth of about 45 inches.

This soil is very frequently flooded in winter and in spring. The water table is within 15 inches of the surface for 2 to 6 months each year.

Because of the frequency of flooding, this soil is not suited to cultivated crops or pasture. All of the acreage is wooded. This soil is well suited to trees, and it provides excellent habitats for wildlife. (Capability unit IVw-5; woodland group 3; woodland grazing group 3; wildlife group 4)

Fuquay Series

The Fuquay series consists of well-drained soils that formed in marine sand and sandy clay loam on uplands throughout the central part of the county. These soils have good tilth and a deep root zone. They are low in organic-matter content, low in natural fertility, and very strongly acid. The available water capacity is low in the surface layer but medium in the subsoil. Runoff is slow.

The Fuquay soils occur with the Stilson, Irvington, and Tifton soils. They are better drained than the Stilson and Irvington soils, and they lack the fragipan that is characteristic of the Irvington soils. They have less clay in the subsoil and contain fewer iron concretions than the Tifton soils.

The Fuquay soils are suited to most of the crops grown locally. Practically all of the acreage is cultivated. Only a few small areas are wooded. The natural vegetation consists mainly of slash pine, longleaf pine, and scrub oak.

Representative profile of Fuquay loamy sand, 0 to 2 percent slopes, in a cultivated field, 4.7 miles south of Patterson, on a dirt road, and 0.7 mile west on right side of dirt road.

Ap—0 to 9 inches, dark grayish-brown (2.5Y 4/2) loamy sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; clear, wavy boundary.

A21—9 to 15 inches, light yellowish-brown (2.5Y 6/4) loamy sand; weak, fine, granular structure; very friable; very strongly acid; clear, wavy boundary.

A22—15 to 22 inches, yellow (10YR 7/6) loamy sand; weak, fine, granular structure; very friable; very strongly acid; abrupt, wavy boundary.

B21t—22 to 30 inches, brownish-yellow (10YR 6/6) sandy clay loam; weak, fine, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.

B22t—30 to 44 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; firm; very strongly acid; gradual, wavy boundary.

B23t—44 to 54 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; firm; very strongly acid; gradual, wavy boundary.

B24t—54 to 65 inches +, yellowish-brown (10YR 5/6) sandy clay loam reticulately mottled with red, strong brown, and light gray; weak, medium, subangular blocky structure; soft plinthite makes up more than 10 percent of this material; firm; very strongly acid.

The Ap horizon ranges from grayish brown to dark grayish brown in color, and the A2 horizon from brownish yellow to light olive brown. The sandy A horizon ranges from 20 to 27 inches in thickness. The solum is more than 50 inches thick. A few soft iron concretions occur at a depth of about 40 to 55 inches.

Fuquay loamy sand, 0 to 2 percent slopes (FsA).—This soil occurs in small areas. The surface layer of loamy sand is about 25 inches thick. The subsoil is yellowish-brown sandy clay loam. In some places there are a few iron concretions on the surface and in the soil material. Small areas in which the surface layer is loamy fine sand were included in the areas mapped.

This soil is suited to most crops grown locally, but it tends to become dry in summer and, therefore, is not well suited to shallow-rooted plants. It is used intensively for corn, cotton, tobacco, and soybeans. Lupine, crotalaria, beggarweed, and velvetbeans are suitable legumes, and Coastal bermudagrass and bahiagrass are suitable grasses. Pecans and many truck crops are also well suited.

Lack of moisture during the hot summer months frequently causes crop damage and sometimes crop loss. If cultivated crops are grown, large amounts of crop residues should be returned to the soil. A cropping sequence that includes perennial grasses is most beneficial. Annual crops that produce a large amount of residue are also satisfactory. For example, corn can be grown year after year if it is mulch planted.

Organic matter is depleted at a moderately rapid rate even if management is good. Turning under crop residues

and using a rotation that includes some cover crops are measures that help to maintain good tilth and to increase the available water capacity.

Wind erosion is a hazard in large, open fields. It can be checked by planting close-growing crops and clean-tilled crops in alternate strips, either on the contour or at right angles to the prevailing wind.

This soil is well suited to sprinkler irrigation. Both row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. Tobacco responds especially well to irrigation. Water for irrigation can be obtained from specially constructed pit wells or ponds. (Capability unit II_s-1; woodland group 1; woodland grazing group 1; wildlife group 6)

Irvington Series

The Irvington series consists of moderately well drained, level or nearly level soils that formed in sand and sandy clay on uplands throughout the county. The largest acreage is in the central part. These soils have a weakly cemented fragipan at a depth of about 26 inches. They are low in natural fertility, low in organic-matter content, and very strongly acid. Permeability is moderate in the upper layers but slow through the fragipan. The available water capacity is medium.

The Irvington soils occur with the Tifton, Fuquay, Stilson, and Robertsdale soils. They differ from the Tifton and Fuquay soils in that they are not so well drained as either of these soils, and they contain a fragipan. They have a thinner surface layer than the Stilson soils and are better drained than the Robertsdale.

The Irvington soils are well suited to most crops grown locally. Most of the acreage is cultivated or in pasture. Some areas have a cover of slash pine, longleaf pine, palmetto, waxmyrtle, gallberry, and oak.

Representative profile of Irvington loamy sand, 0 to 2 percent slopes, in a cultivated field 0.3 mile east of the Pierce-Ware County line and 0.3 mile north of paved road leading from Blackshear to Waltertown.

Ap—0 to 8 inches, grayish-brown (2.5Y 5/2) loamy sand; weak, fine, granular structure; very friable; many roots; few medium and coarse ironstone pebbles; strongly acid; clear, smooth boundary.

A3—8 to 12 inches, light olive-brown (2.5Y 5/6) loamy sand; weak, fine, granular structure; friable; few roots; few medium ironstone pebbles; very strongly acid; abrupt, wavy boundary.

B2tcn—12 to 26 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, fine, prominent mottles of strong brown and light yellowish brown; weak, fine, subangular blocky structure; friable to firm when moist; many medium-sized pebbles; very strongly acid; gradual, wavy boundary.

Bxcn—26 to 33 inches, brownish-yellow (10YR 6/6) sandy clay loam; many, fine, prominent mottles of yellowish brown and light yellowish brown; weak, fine, subangular blocky structure; firm; many hard pebbles; soft plinthite makes up more than 10 percent of the material; very strongly acid; abrupt, wavy boundary.

B3tg—33 to 60 inches, yellowish-brown (10YR 5/6) clay loam; many, medium, prominent mottles of light yellowish brown, yellowish red, and light gray; weak, medium, subangular blocky structure; firm when moist; very strongly acid.

The Ap horizon ranges from olive gray to grayish brown in color. The B horizon ranges from olive yellow to yellowish brown and is mottled with light yellowish brown to strong

brown. The B horizon ranges from sandy clay loam to clay loam. A weakly cemented fragipan occurs at a depth of 20 to 36 inches. Iron concretions on the surface and throughout the soil material range from a few in some places to many in other places and increase in quantity with depth.

Irvington loamy sand, 0 to 2 percent slopes (II_A).—The surface layer of this soil is grayish-brown to olive-gray loamy sand about 8 inches thick. The subsoil is olive-yellow to yellowish-brown sandy clay loam. A weakly developed fragipan occurs at a depth of 20 to 36 inches.

From 2 to 6 months each year, the water table is at a depth between 15 and 30 inches. Consequently, if this soil is cultivated, some type of drainage is needed.

This soil is suited to many different kinds of crops. If management is good, it is well suited to corn (fig. 2), tobacco, cotton, and soybeans. It is also well suited to oats, rye, and other small grain. Lupine, crotalaria, beggarweed, and velvetbeans are suitable legumes, and Coastal bermudagrass and bahiagrass are suitable pasture grasses.



Figure 2.—Corn growing in a drained area of Irvington loamy sand, 0 to 2 percent slopes. This soil is in capability unit II_w-2.

This soil can be tilled year after year with little risk of erosion, but it is more productive if a good cropping sequence is used. An example of a suitable cropping system is 1 year of tobacco followed by 2 years of perennial grass. The response to fertilization is good.

Organic matter is depleted at a moderate rate, even under a high level of management. If the cropping system does not include perennials, then all crop residues or a cover crop should be turned under just prior to the planting of the next crop.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops and pasture plants. Crops generally respond if supplemental water is applied at this time. This soil is suited to irrigation, and a supply of water can be obtained by means of specially constructed pit wells or ponds. (Capability unit II_w-2; woodland group 2; woodland grazing group 2; wildlife group 4)

Kershaw Series

The Kershaw series consists of deep, excessively drained soils that formed in thick beds of sand on undulating ridges along the Satilla and Alabama Rivers. These soils are low in available water capacity, low in organic-matter content, and very strongly acid. Permeability is very rapid.

The Kershaw soils commonly occur with the Lakeland soils. They are coarser textured and browner than the Lakeland soils. The sand grains in the Kershaw soils are uncoated, whereas there is enough silt and clay in the Lakeland soils to coat the sand grains.

The Kershaw soils are extremely droughty and are not suited to cultivated crops. All of the acreage is wooded. The vegetation consists mainly of turkey oak, blackjack oak, and various shrubs.

Representative profile of Kershaw coarse sand, 0 to 5 percent slopes, in a wooded area half a mile northeast of the Alabama River on Georgia Highway No. 15, then west a quarter of a mile on three-path road.

A1—0 to 3 inches, very dark grayish-brown (2.5Y 3/2) coarse sand; single grain; loose; few fine roots; very strongly acid; abrupt, smooth boundary.

C1—3 to 38 inches, yellowish-brown (10YR 5/8) coarse sand; single grain; loose; few fine roots in uppermost 7 inches; very strongly acid; gradual, wavy boundary.

C2—38 to 66 inches +, strong-brown (7.5YR 5/8) coarse sand; single grain; loose; very strongly acid.

The A1 horizon ranges from very dark grayish brown to dark gray in color, and the C horizon from yellowish brown to strong brown. The sand is more than 5 feet thick.

Kershaw coarse sand, 0 to 5 percent slopes (KkB).—The surface layer of this soil is very dark grayish-brown to dark-gray coarse sand 3 to 5 inches thick. It is underlain to a depth of several feet by yellowish-brown coarse sand. Small areas that have a slope of as much as 8 percent were included in the areas mapped. Runoff is slow. Thus, sheet erosion is not a hazard, but gullies are likely to form if water is concentrated on slopes.

This soil is extremely droughty. Therefore, it is not suited to either cultivated crops or pasture. Yields of Coastal bermudagrass, bahiagrass, and other deep-rooted pasture grasses are very low, even if management is good. Pine trees grow fairly well once they become established. (Capability unit VII_s-1; woodland group 4; woodland grazing group 4; wildlife group 7)

Lakeland Series

The Lakeland series consists of deep, excessively drained soils that formed in thick beds of marine sand on uplands along the Satilla and Alabama Rivers. These soils are low in organic-matter content, low in available water capacity, and very strongly acid. Permeability is rapid.

The Lakeland soils are associated with and are similar to the Kershaw and Chipley soils. They are less sandy than the Kershaw soils and are better drained than the Chipley.

Low fertility and low available moisture capacity limit the suitability of the Lakeland soils for cultivated crops. Most of the acreage is wooded. The natural vegetation consists mainly of turkey oak, blackjack oak, longleaf pine, and wiregrass.

Representative profile of Lakeland sand, 0 to 5 percent

slopes, in a wooded area 0.5 mile northeast of the Alabama River on Georgia Highway No. 15, then west 1.25 miles.

A1—0 to 4 inches, very dark gray (N 3/0) sand; structureless; loose; many fine roots; very strongly acid; abrupt, smooth boundary.

C1—4 to 26 inches, light olive-brown (2.5Y 5/4) sand; structureless; loose; common fine roots; very strongly acid; gradual, wavy boundary.

C2—26 to 68 inches +, yellowish-brown (10YR 5/4) sand; structureless; loose; very strongly acid.

The A1 horizon ranges from very dark gray to grayish brown in color, and the C horizon ranges from pale yellow to yellowish brown and brownish yellow. The depth to finer textured material is more than 72 inches.

Lakeland sand, 0 to 5 percent slopes (LpB).—The surface layer of this soil consists of 4 to 6 inches of very dark gray to grayish-brown sand. It is underlain by pale-yellow to brownish-yellow sand to a depth of more than 72 inches. Included in the areas mapped are small areas in which the surface layer is fine sand and some areas in which sandy clay loam occurs at a depth of about 45 inches.

This soil is extremely droughty. It is not well suited to cultivated crops, but it is fairly well suited to Coastal bermudagrass, bahiagrass, and other deep-rooted pasture plants. Pine trees grow fairly well once they become established.

The lack of water during prolonged dry periods results in reduced crop yields and, in some cases, complete crop loss. If crops are grown, a suitable cropping system is 3 years of a perennial sod crop followed by 1 year of corn.

Organic matter is depleted rapidly even if management is good. Consequently, large amounts of organic material should be added frequently. Such treatment helps to increase the available water capacity. The response to fertilization is good if the supply of moisture is adequate, but plant nutrients are readily leached from this soil.

Irrigation is not practical, because of the difficulty of obtaining an adequate supply of water. Also, productivity is low. (Capability unit IV_s-1; woodland group 5; woodland grazing group 5; wildlife group 7)

Leefield Series

The Leefield series consists of somewhat poorly drained soils that formed in beds of sand over sandy clay loam. These soils occur on low uplands throughout the county but are mainly in the western half. They are low in natural fertility, low in organic-matter content, and very strongly acid. Permeability is rapid in the surface layer, moderate in the upper part of the subsoil, and slow in the lower part, or plinthitic layer. The available water capacity is low in the uppermost 20 to 40 inches and medium below this depth. Because of a fluctuating water table, these soils are wet during rainy periods and dry during prolonged dry periods.

The Leefield soils commonly occur with the Albany, Chipley, and Pelham soils. They differ from the Albany soils in that there is a considerable amount of plinthite in their subsoil. They are underlain by sandy clay loam at a depth of 20 to 40 inches, whereas the Chipley soils are sand to a depth of 40 inches or more. They are better drained and browner than the Pelham soils.

The Leefield soils are suited to most crops grown locally. Most of the acreage is cultivated.

Representative profile of Leefield sand, 0 to 2 percent

slopes, in a wooded area 1 mile southeast of the Bacon County line on Georgia Highway No. 32, right on dirt road, a quarter of a mile west and a quarter of a mile north.

A1—0 to 4 inches, very dark grayish-brown (2.5Y 3/2) sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary.

A2—4 to 32 inches, pale-yellow (5Y 7/3) sand; few, fine, faint mottles of yellow; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.

B21t—32 to 44 inches, light-gray (2.5Y 7/2) sandy clay loam; common, medium, prominent mottles of yellowish brown; weak, medium, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.

B22tg—44 to 56 inches, light-gray (10YR 7/1) sandy clay loam reticulately mottled with yellowish brown and yellow; weak, medium, subangular blocky structure; soft plinthite makes up more than 10 percent of material; firm; very strongly acid; gradual, wavy boundary.

B23t—56 to 65 inches +, sandy clay loam reticulately mottled with pale yellow (5Y 7/3), yellow (2.5Y 7/6), and red (2.5YR 5/8); weak, medium, subangular blocky structure; soft plinthite makes up more than 10 percent of the material; firm; very strongly acid.

The A1 horizon ranges from very dark gray to grayish brown in color, and the A2 horizon from pale yellow to light yellowish brown mottled with yellowish brown, yellow, gray, or white. The sandy A2 horizon is underlain by sandy clay loam. The depth to this finer textured material ranges from 20 to 40 inches. The B horizon ranges from light gray to yellowish brown in color and is mottled with gray, yellow, and brown.

Leefield sand, 0 to 2 percent slopes (LiA).—The surface layer of this soil is from 20 to 40 inches thick and is predominantly sand. The subsoil is light-gray sandy clay loam that at a depth of about 55 inches is mottled with pale yellow, yellow, and red. Soft iron concretions occur in the lower part of the subsoil. A few small areas in which the surface layer is loamy sand or fine sand were included in the areas mapped.

For more than 6 months each year, the water table is at a depth between 15 and 30 inches. Consequently, some type of drainage is needed if this soil is used for cultivated crops.

This soil is suited to many different kinds of crops. Corn, tobacco, cotton, and soybeans are well suited if management is good. Oats, rye, and other small grain are also well suited. Lupine, crotalaria, beggarweed, and velvetbeans are suitable legumes, and Coastal bermudagrass and bahiagrass are suitable grasses.

This soil can be tilled year after year with little risk of erosion, but it is more productive if a good cropping system is used. An example of a suitable cropping system is 1 year of tobacco followed by 2 years of perennial grass. The response to fertilization is good.

Organic matter is depleted at a moderate rate, even under a high level of management. If the cropping system does not include perennials, then all crop residues or a cover crop should be turned under just prior to the planting of the next crop.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops and pasture plants. Crops generally respond if supplemental water is applied at this time. This soil is suited to irrigation, and a supply of water can be obtained by means of specially constructed pit wells or ponds. (Capability unit IIw-2; woodland group 6; woodland grazing group 6; wildlife group 3)

Lumbee Series

The Lumbee series consists of poorly drained, level or nearly level soils that formed in old alluvium on stream terraces along the Satilla, Little Satilla, and Alabama Rivers. These soils are flooded frequently in winter and in spring, and they generally remain saturated for several months. They are low in organic-matter content, low in natural fertility, and medium in available water capacity. They are very strongly acid.

The Lumbee soils commonly occur with the Albany and Dunbar soils, but they are more poorly drained than these soils. They have a finer textured subsoil than the Albany soils and a grayer subsoil than the Dunbar soils.

The Lumbee soils are not suited to cultivated crops. All of the acreage is wooded. The vegetation consists mainly of pine, water oak, blackgum, cypress, bay, waxmyrtle, palmetto, and gallberry.

Representative profile of Lumbee fine sandy loam, in a wooded area 3 miles south of Pine Grove Church and 0.1 mile north of the Alabama River.

A1—0 to 6 inches, black (10YR 2/1) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1tg—6 to 9 inches, gray (10YR 5/1) sandy clay loam; few, fine, distinct mottles of light olive brown; weak, fine, subangular blocky structure; friable; few fine roots; very strongly acid; clear, wavy boundary.

B21tg—9 to 15 inches, gray (10YR 5/1) sandy clay loam; common, fine, distinct mottles of light olive brown; weak, fine, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.

B22tg—15 to 29 inches, gray (10YR 5/1) sandy clay; few, fine, distinct mottles of light olive brown; very strongly acid; abrupt, wavy boundary.

C—29 to 50 inches, gray (10YR 6/1) sandy loam; common, fine, faint mottles of yellowish brown; weak, fine, granular structure; friable; very strongly acid.

The A1 horizon ranges from black to dark gray. The B horizon is various shades of gray mottled with light olive brown to yellowish brown. It ranges from sandy clay loam to sandy clay.

Lumbee fine sandy loam (0 to 2 percent slopes) (lum).—The surface layer of this soil is black to dark-gray fine sandy loam 5 to 7 inches thick. The subsoil is gray sandy clay loam to sandy clay mottled with shades of olive, brown, and yellow. Coarser textured material commonly occurs at a depth of about 30 inches. Included in the areas mapped are small areas in which the surface layer is either more sandy or more loamy than that of this soil.

This soil occurs on low terraces and is flooded in winter and in spring. It generally remains saturated for several months. The water table is within 15 inches of the surface for more than 6 months each year.

Because of the frequency of flooding, this soil is not well suited to cultivated crops. It is suitable for trees, and nearly all of the acreage is wooded. It provides excellent habitats for wildlife. (Capability unit IVw-4; woodland group 3; woodland grazing group 3; wildlife group 1)

Mascotte Series

The Mascotte series consists of poorly drained, nearly level soils that formed in marine sand on low uplands, mainly in the eastern third of the county. These soils have a cemented organic layer at a depth of about 16 inches. They have low to medium available water capacity but commonly are saturated for several months in winter

and in spring because of a fluctuating water table. Permeability is rapid in the surface layer but moderate to slow in the organic layer. The reaction is very strongly acid.

The Mascotte soils commonly occur with the Albany, Pelham, and Rutlege soils. They have a leached A2 horizon, which is lacking in the Albany soils, and they contain an organic layer, which is lacking in both the Albany and the Pelham soils. They lack the thick black surface layer that is characteristic of the Rutlege soils.

Only a few areas of the Mascotte soils are used for cultivated crops and pasture. Most of the acreage is wooded. The natural vegetation consists principally of longleaf pine, slash pine, palmetto, gallberry, waxmyrtle, and runner oak.

Representative profile of Mascotte sand, in a wooded area an eighth of a mile northeast of the Alabama River on Georgia Highway No. 38, right on paved road for 1.5 miles, then right on dirt road for 1.3 miles.

- A1—0 to 5 inches, very dark gray (N 3/0) sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, wavy boundary.
- A2—5 to 16 inches, white (2.5Y 8/2) sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; abrupt, smooth boundary.
- B2h—16 to 21 inches, very dark grayish-brown (10YR 3/2) sand; weak, fine, subangular blocky structure; firm to friable; very strongly acid; abrupt, wavy boundary.
- B3—21 to 27 inches, dark-brown (10YR 4/3) sand; common, medium, faint mottles of very dark grayish brown; weak, fine, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.
- C1—27 to 36 inches, pale-yellow (2.5Y 8/4) sand; few, fine, faint mottles of light olive brown; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.
- C2—36 to 48 inches, pale-yellow (5Y 7/3) sand; weak, fine, granular structure; very friable; very strongly acid; clear, wavy boundary.
- IIBtg—48 to 64 inches +, light-gray (10YR 6/1) sandy clay loam; few, fine, distinct mottles of strong brown; moderate, medium, subangular blocky structure; firm; very strongly acid.

The A1 horizon ranges from black to gray in color. A friable to extremely firm B2h (organic) horizon occurs at a depth of 11 to 29 inches. The organic horizon is underlain by sand that is mottled with very pale brown, pale yellow, or brownish yellow. Sandy loam or sandy clay loam occurs at a depth of 24 to 48 inches.

Mascotte sand (0 to 2 percent slopes) (MnA).—The surface layer of this soil is predominantly very dark gray sand over white sand. It is underlain at a depth of 11 to 29 inches by a 4- to 6-inch layer of very dark grayish-brown sand partly cemented by organic matter. Pale-yellow sand underlies this organic layer, generally to a depth of about 50 inches, and, in turn, is underlain by gray sandy clay loam. In some places the sandy clay loam occurs at a depth of only 24 to 48 inches.

For 2 to 6 months each year, the water table is at or within 15 inches of the surface. Consequently, unless drained, this soil is not well suited to cultivated crops. During dry periods, the water table drops below the cemented organic layer. Since this layer is not readily penetrated by plant roots, crops frequently are damaged by lack of moisture. Permanent pasture plants grow fairly well if management is good. Pine trees are well suited, and most of the acreage is wooded. This soil provides excellent habitats for deer, turkeys, squirrels, and ducks. (Capabil-

ity unit Vw-4; woodland group 6; woodland grazing group 6; wildlife group 2)

Osier Series

The Osier series consists of poorly drained, sandy soils that formed in alluvium along small drainageways. These soils are flooded frequently in winter and in spring. They are low in natural fertility, low to medium in organic-matter content, and very strongly acid.

The Osier soils are adjacent to the Lakeland, Tifton, Irvington, Pelham, and Rutlege soils, which are on uplands, and they are intermixed with Alluvial land. They are of more recent origin and are more highly stratified than the soils on uplands, and they have more uniform profile characteristics than Alluvial land.

The Osier soils are extremely wet and, therefore, are not important to farming. Most of the acreage is wooded. In Pierce County, the Osier soils are mapped only as an undifferentiated mapping unit with Alluvial land.

Representative profile of Osier sand, in an intermittent drainageway in the southwestern part of the county, 2 miles northeast of the Pierce-Ware County line, on U.S. Highway No. 82.

- A1—0 to 12 inches, pale-yellow (5Y 7/3) sand; weak, fine, granular structure; very friable; few roots; very strongly acid; clear, wavy boundary.
- C1—12 to 30 inches, grayish-brown (2.5Y 5/2) sand stratified with lenses of light olive-gray sand; single grain; very friable; very strongly acid; clear, wavy boundary.
- C2—30 to 52 inches +, gray (N 6/0) sand; single grain; loose; stratified with pockets of loamy sand; very strongly acid.

The A1 horizon ranges from pale-yellow to dark-gray sand to loamy sand and is 10 to 14 inches thick. The extent of stratification within the profile varies from one area to another. In places thin layers of sandy loam and sandy clay loam occur in the solum.

Osier soils and Alluvial land (0 to 2 percent slopes) (Osc).—The Osier soils and Alluvial land occur throughout the county along intermittent, meandering streams that are between 150 and 300 feet in width. These soils are so intermixed that it was considered impractical to map them separately.

The surface layer of the Osier soils is pale-yellow or dark-gray sand to loamy sand and is 10 to 14 inches thick. This layer is underlain to a depth of more than 52 inches by gray to grayish-brown sand.

Alluvial land is poorly drained. It formed in highly stratified deposits consisting mainly of sand, silt, and various amounts of organic material. The surface layer ranges from light gray to black in color and from sand to mucky loam in texture.

These soils are flooded more often than once each year for periods of a week to a month. The water table is at or within 15 inches of the surface for 6 months or more each year. Because of extreme wetness and the hazard of flooding, the most suitable use for these soils is trees. Most areas are wooded. The present vegetation consists mainly of cypress, blackgum, maple, bay, poplar, willow, slash pine, and a thick understory of titi, fetterbush, and greenbrier. These soils provide natural habitats for several different kinds of wildlife. (Capability unit Vw-3; woodland group 3; woodland grazing group 3; wildlife group 1)

Pelham Series

The Pelham series consists of poorly drained soils that formed in sand on low broad flats and in slight depressions or ponded areas throughout the county. The largest acreage is in the extreme western and southeastern parts. These soils are wet for periods of more than 6 months each year. They are low in organic-matter content, low in natural fertility, and very strongly acid. Permeability is rapid in the upper part of the solum but moderate in the lower part.

The Pelham soils commonly occur with the Albany, Lee-field, Portsmouth, and Rutlege soils. They have a wetter, grayer subsoil than the Albany and Lee-field soils and a coarser textured subsoil than the Portsmouth soils. They lack the thick black surface layer that is characteristic of the Portsmouth and Rutlege soils.

Almost all the acreage of the Pelham soils is wooded. The vegetation consists principally of slash pine, longleaf pine, blackgum, and cypress and an understory of gallberry, waxmyrtle, swamp holly, wiregrass, pitcherplants, and palmetto.

Representative profile of Pelham sand, 0 to 2 percent slopes, in a wooded area 2 miles west of Emanuel Baptist Church in Blackshear, on a paved road, south of farm pond, on southwest side of highway.

- A1—0 to 8 inches, dark-gray (5Y 4/1) sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; gradual, wavy boundary.
- A21g—8 to 18 inches, gray (5Y 5/1) sand; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.
- A22g—18 to 37 inches, gray (10YR 6/1) sand; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.
- B21tg—37 to 54 inches, gray (10YR 6/1) sandy loam with lenses of sandy clay; few, fine, faint mottles of yellow; weak, fine, subangular blocky structure; firm; very strongly acid; gradual, wavy boundary.
- B22tg—54 to 66 inches +, pale-brown (10YR 6/3) sandy clay loam; few, medium, distinct mottles of light gray, and few, medium, distinct mottles of reddish brown; moderate, medium, subangular blocky structure; firm; very strongly acid.

The A1 horizon ranges from gray to dark gray in color, and the A2 horizon from gray to light gray. The depth to the finer textured material ranges from 20 to 40 inches. The color of the B horizon ranges from gray to brownish yellow mottled with olive, yellow, and brownish yellow, and the texture from sandy loam to sandy clay loam.

Pelham sand, 0 to 2 percent slopes (PaA).—This soil is on broad flats and in depressions. The surface layer is gray to dark-gray sand about 8 inches thick. It is underlain to a depth of about 20 to 40 inches by gray sand. The lower subsoil is gray to pale-brown sandy loam to sandy clay loam. Included in the areas mapped are small areas in which the surface layer is fine sand.

This soil is flooded frequently for short periods, especially in winter and in spring. Runoff is slow, and water ponds in many areas.

Because of the frequency of flooding, this soil is not well suited to cultivated crops, although a few small areas are cultivated (fig. 3). Some areas require surface drainage if used for pasture. This soil is suitable for trees, and it provides excellent habitats for wildlife. (Capability unit IVw-4; woodland group 3; woodland grazing group 3; wildlife group 1)



Figure 3.—Ponded areas of Pelham sand, 0 to 2 percent slopes, showing crop loss caused by drowning. This soil is in capability unit IVw-4.

Portsmouth Series

The Portsmouth series consists of very poorly drained soils that formed in sand and sandy clay along drainage-ways and in depressions throughout the county. Most areas are flooded at least once each year. Runoff is slow, and water ponds in many areas. The water table is at or within 15 inches of the surface about half of the time. These soils are low to moderate in organic-matter content, low to moderate in natural fertility, and very strongly acid.

The Portsmouth soils commonly occur with Pelham and Rutlege soils. They are more poorly drained than the Pelham soils, and they have a thick black surface layer, which is lacking in the Pelham soils. They differ from the Rutlege soils in that they are underlain by sandy clay loam at a depth of less than 20 inches, whereas the Rutlege soils are sandy to a depth of 40 inches or more.

Most of the acreage of the Portsmouth soils is wooded. The natural vegetation consists mainly of slash pine, cypress, gum, swamp holly, and waxmyrtle.

Representative profile of Portsmouth loam, in a ponded area 3¼ miles east of the Satilla River and U.S. Highway No. 82, generally west on dirt road 1 mile, on south side of road.

- A1—0 to 12 inches, black (10YR 2/1) loam; weak, fine, granular structure; very friable; numerous roots; very strongly acid; abrupt, wavy boundary.
- A2—12 to 16 inches, light-gray (10YR 7/1) sand; single grain; loose; many roots; very strongly acid; abrupt, wavy boundary.
- B1tg—16 to 25 inches, gray (10YR 5/1) sandy clay loam; few sand lenses with few, fine, faint mottles of light gray and yellowish brown; moderate, fine, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.
- B21tg—25 to 46 inches, grayish-brown (10YR 5/2) sandy clay loam; few sand lenses with common, fine, faint mottles of light gray and yellowish brown; strong, medium, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.
- B22tg—46 to 54 inches +, grayish-brown (10YR 5/2) sandy clay loam; few, fine, faint mottles of yellowish brown; moderate, medium, subangular blocky structure; firm; very strongly acid.

The A1 horizon ranges from 10 to 16 inches in thickness, and the A2 horizon from 2 to 6 inches. The B horizon ranges from sandy clay loam to sandy clay in texture and contains lenses or pockets of sand. The color of the B horizon is light brownish gray to dark gray mottled with light gray, yellowish brown, yellowish red, and brownish yellow.

Portsmouth loam (0 to 2 percent slopes) (Por).—The surface layer of this soil is black loam that is 10 to 16 inches thick. The subsoil is gray to grayish-brown sandy clay loam to sandy clay mottled with yellowish brown and gray. In most places the subsoil contains lenses and pockets of sand. Included in the areas mapped are small areas in which the surface layer is fine sandy loam or silt loam and some areas where red mottles occur in the subsoil.

This soil is severely limited in its use for crops or pasture because of wetness and the hazard of flooding. Drained areas can be used for cultivated crops and pasture plants, but most areas are difficult to drain because of the lack of suitable outlets (fig. 4). Bahiagrass and tall fescue are suitable pasture grasses. Pine can be grown. Trees reseed more readily and grow better in areas that are artificially drained (fig. 5). Extremely wet areas that are impractical to drain can be managed for hardwoods. (Capability unit IIIw-2; woodland group 3; woodland grazing group 3; wildlife group 1)

Robertsdale Series

The Robertsdale series consists of deep, somewhat poorly drained soils that formed in sand and sandy clay loam on broad flats on uplands, mainly in the western half of the county. These soils are low in organic-matter content and low in natural fertility. They are very strongly acid. Tilth is good, but some drainage is needed. A fragipan occurs at a depth of 20 to 36 inches.

The Robertsdale soils occur with the Irvington, Leefield, and Pelham soils. They are less well drained than the Irvington soils and are better drained than the Pelham. They have a distinct fragipan, which is lacking in the Leefield and Pelham soils.

The Robertsdale soils are extensive, and most of the acreage is cultivated. The natural vegetation consists mainly of slash pine, longleaf pine, gallberry, waxmyrtle, palmetto, and wiregrass.

Representative profile of Robertsdale loamy sand, 0 to 2 percent slopes, in a cultivated field, 1.5 miles northwest of Jot'em Down Store on paved road, and 0.7 mile west on dirt road, on right side of road.

Ap—0 to 9 inches, gray (5Y 5/1) loamy sand; weak, fine, granular structure; very friable; few fine roots; few iron concretions; very strongly acid; clear, wavy boundary.



Figure 4.—Inadequately drained area of Portsmouth loam. This soil is in capability unit IIIw-2.



Figure 5.—Adequately drained area of Portsmouth loam. This soil is in capability unit IIIw-2.

- A2—9 to 15 inches, mottled pale-yellow (2.5Y 7/4) and brownish-yellow (10YR 6/8) loamy sand; weak, fine, granular structure; very friable; few fine roots; few iron concretions; very strongly acid; clear, wavy boundary.
- B1—15 to 24 inches, pale-yellow (2.5Y 7/4) sandy loam; few, fine, faint mottles of brownish yellow; weak, fine, granular structure; friable; few iron concretions; very strongly acid; clear, wavy boundary.
- B2t—24 to 33 inches, pale-yellow (2.5Y 7/4) sandy clay loam; few, fine, faint mottles of brownish yellow and light gray; weak, fine, subangular blocky structure; firm; few iron concretions; very strongly acid; gradual, wavy boundary.
- Bxcn—33 to 48 inches, pale-yellow (2.5Y 7/4) sandy clay loam; many, fine, distinct mottles of yellowish brown, yellow, and light gray; weak, medium, subangular blocky structure; firm; soft plinthite makes up more than 10 percent of the material; very strongly acid; clear, wavy boundary.
- B31t—48 to 56 inches, pale-yellow (2.5Y 7/4) sandy clay loam reticulately mottled with brownish yellow, yellowish brown, and light gray; weak, medium, subangular blocky structure; firm; soft plinthite makes up more than 10 percent of the material; very strongly acid; gradual, wavy boundary.
- B32t—56 to 64 inches +, reticulately mottled pale-yellow (2.5Y 7/4), brownish-yellow (10YR 6/8), yellowish-brown (10YR 5/8), light-gray (2.5Y 7/2), and red (2.5YR 4/8) sandy clay loam; weak, medium, subangular blocky structure; firm; many soft concretions; very strongly acid.

The Ap horizon ranges from gray to very dark grayish brown in color. The B2t horizon ranges from pale yellow to light yellowish brown mottled with gray, olive, yellow, and yellowish brown. The depth to the fragipan ranges from 20 to 36 inches. Iron concretions throughout the solum vary from a few in some places to many in others. There is a high concentration of iron concretions in the fragipan.

Robertsdale loamy sand, 0 to 2 percent slopes (RIA).—The surface layer of this soil is gray loamy sand and is 8 to 10 inches thick. The subsoil is pale-yellow sandy clay loam mottled with brown, yellow, and gray. A fragipan is at a depth of 20 to 36 inches. The lower subsoil contains soft plinthite, and is reticulately mottled at a depth of 56 to 64 inches. Small areas in which the surface layer is sand or fine sand were included in the areas mapped.

For more than 6 months each year, the water table is at a depth between 15 and 30 inches. Consequently, some type of drainage is needed if this soil is used for cultivated crops (fig. 6).

This soil is suited to many different kinds of crops. Corn, tobacco, cotton, and soybeans are well suited if management is good. Oats, rye, and other small grains also are suited. Lupine, crotalaria, beggarweed, and velvetbeans are suitable legumes, and Coastal bermudagrass and bahiagrass are suitable pasture grasses.

This soil can be tilled year after year with little risk of erosion, but it is more productive if a good cropping system is used. An example of a suitable cropping system is 1 year of tobacco followed by 2 years of perennial grass. The response to fertilization is good.

Organic matter is depleted at a moderate rate, even under a high level of management. If the cropping system does not include perennials, then all crop residues or a cover crop should be turned under just prior to the planting of the next crop.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops and pasture plants. Crops generally respond if supplemental water is applied at this time. This soil is suited to irrigation, and a



Figure 6.—Crop loss on Robertsdale loamy sand, 0 to 2 percent slopes, because of inadequate drainage. This soil is in capability unit IIw-2.

supply of water can be obtained by means of specially constructed pit wells or ponds. (Capability unit IIw-2; woodland group 2; woodland grazing group 2; wildlife group 4)

Rutlege Series

The Rutlege series consists of deep, very poorly drained soils that formed in sand along drainageways and in ponded areas throughout the county. These soils are moderate in natural fertility and medium in organic-matter content. They are very strongly acid. Runoff is slow.

The Rutlege soils commonly occur with Pelham and Mascotte soils. They differ from the Pelham soils in that they are wetter and have a darker colored surface layer. They lack the organic layer (B2h horizon) that is characteristic of the Mascotte soils, and they are sandier to a greater depth.

The Rutlege soils are not extensive. All of the acreage is in a mixed forest consisting of cypress, blackgum, a few scattered pine, and an understory of titi, swamp holly, and other water-tolerant plants.

Representative profile of Rutlege sand, in a pasture 17/8 miles southwest of intersection of U.S. Highway No. 82 and Georgia Highway No. 121 in Blackshear, on U.S. Highway No. 82, 150 yards west on dirt road, north side of road.

- A11—0 to 8 inches, black (10YR 2/1) sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; gradual, wavy boundary.
- A12—8 to 20 inches, very dark gray (10YR 3/1) sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; gradual, wavy boundary.
- C1g—20 to 30 inches, dark-gray (10YR 4/1) sand; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.
- C2g—30 to 48 inches, light-gray (10YR 7/1) sand; few, fine, faint mottles of gray; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.

C3g—48 to 65 inches +, gray (10YR 5/1) sand; weak, fine, granular structure; friable; very strongly acid.

The A horizon ranges from black to very dark gray in color and from 10 to 24 inches in thickness. The C horizon ranges from dark gray to light gray and contains mottles that range from gray to yellow. The depth to finer textured material ranges from 40 inches to more than 65 inches.

Rutlege sand (0 to 2 percent slopes) (RkA).—This soil has a very dark gray to black surface layer that is 6 to 10 inches thick. It is underlain by dark-gray sand that grades to gray or light-gray sand at a depth of about 30 inches. Included in the areas mapped are a few small areas in which the surface layer is fine sand.

This soil is flooded more frequently than once each year for periods of 1 to 6 months (fig. 7), and it has a high water table that for more than half the year is within 15 inches of the surface. It is not suited to cultivated crops unless extensive channel improvements are made and canals are constructed. Some areas can be used for permanent pasture if they are adequately drained and intensively managed. Drainage ditches help to lower the water table. This soil is suited to trees, and it provides good habitats for deer, turkeys, squirrels, and ducks. (Capability unit Vw-2; woodland group 3; woodland grazing group 3; wildlife group 1)



Figure 7.—Undrained area of Rutlege sand. This soil is in capability unit Vw-2.

Stilson Series

The Stilson series consists of moderately well drained, level or nearly level soils that formed in marine deposits of sand and sandy clay loam on uplands, mainly in the western half of the county. These soils have good tilth and a deep root zone. They are very strongly acid.

The available water capacity is low in the sandy surface layer but medium in the subsoil. Permeability is moderate.

The Stilson soils commonly occur with the Fuquay, Tifton, Irvington, and Robertsdale soils. They are less well drained than the Fuquay and Tifton soils but are better drained than the Robertsdale. They have light brownish-gray mottles caused by a high water table in the upper part of the subsoil, whereas Fuquay and Tifton soils are free of mottles caused by wetness. They have a thicker A horizon than Irvington soils and lack the fragipan that is characteristic of those soils.

The Stilson soils are suited to most crops grown locally. Most of the acreage is cultivated.

Representative profile of Stilson loamy sand, 0 to 2 percent slopes, in a cultivated field 4 miles south of Paterson on a dirt road and half a mile west on a private road.

- Ap—0 to 7 inches, very dark grayish-brown (2.5Y 3/2) loamy sand; weak, fine, granular structure; very friable; few iron concretions; few roots; very strongly acid; abrupt, smooth boundary.
- A2—7 to 18 inches, light olive-brown (2.5Y 5/4) loamy sand; weak, fine, granular structure; very friable; few iron concretions; very strongly acid; gradual, wavy boundary.
- A3—18 to 26 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, fine, granular structure; very friable; few iron concretions; very strongly acid; gradual, wavy boundary.
- B1t—26 to 30 inches, brownish-yellow (10YR 6/6) sandy loam; few, fine, faint mottles of light brownish gray; weak, fine, granular structure; very friable; few iron concretions; very strongly acid; clear, wavy boundary.
- B21t—30 to 36 inches, brownish-yellow (10YR 6/6) sandy clay loam; few, fine, faint mottles of light brownish gray; weak, fine, subangular blocky structure; friable; few iron concretions; very strongly acid; clear, wavy boundary.
- B22t—36 to 42 inches, brownish-yellow (10YR 6/6) sandy clay loam; many, fine, prominent mottles of light brownish gray and red; moderate, fine, subangular blocky structure; firm; soft plinthite makes up more than 10 percent of the material; very strongly acid; clear, wavy boundary.
- B23tg—42 to 52 inches +, brownish-yellow (10YR 6/6) sandy clay loam; many, medium, prominent mottles of light gray and red; soft plinthite makes up more than 10 percent of the material; weak, fine, subangular blocky structure; firm; very strongly acid.

The Ap horizon ranges from very dark grayish brown to grayish brown in color, and the A2 horizon from light olive brown to light yellowish brown. The A horizon ranges from 20 to 28 inches in thickness. The B horizon ranges from pale yellow to yellowish brown and is mottled with light brownish gray, brown, and red. A layer containing a high concentration of soft plinthite is at a depth of about 26 to 44 inches and is weakly cemented in places. Iron concretions on the surface and throughout the solum vary from a few in some places to many in others, and they generally increase in number with depth.

Stilson loamy sand, 0 to 2 percent slopes (SeA).—The surface layer of this soil is very dark grayish-brown to olive-gray loamy sand that is 18 to 30 inches thick. The subsoil is pale-yellow to yellowish-brown sandy clay loam

mottled with gray and red. The lower subsoil contains a considerable amount of plinthite. Small areas in which the surface layer is loamy fine sand were included in the areas mapped.

From 2 to 6 months each year, the water table is at a depth between 15 and 30 inches. Consequently, some type of drainage is needed if crops are grown.

This soil is suited to many different kinds of crops. Corn, tobacco, cotton, and soybeans are well suited if management is good. Oats, rye, and other small grain also are well suited. Lupine, crotalaria, beggarweed, and velvetbeans are suitable legumes, and Coastal bermudagrass and bahia-grass are suitable pasture grasses. Pine trees also grow well.

This soil can be tilled year after year with little risk of erosion, but it is more productive if a good cropping system is used. An example of a suitable cropping system is 1 year of tobacco followed by 2 years of perennial grass. The response to fertilization is good.

Organic matter is depleted at a moderate rate, even under a high level of management. If the cropping system does not include perennials, then all crop residues or a cover crop should be turned under just prior to the planting of the next crop.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops and pasture plants. Crops generally respond if supplemental water is applied at this time. This soil is suited to irrigation, and a supply of water can be obtained by means of specially constructed pit wells or ponds. (Capability unit IIw-2; woodland group 2; woodland grazing group 2; wildlife group 4)

Swamp

Swamp occurs on flood plains along rivers, large creeks, and large bays. It is wet most of the year. In winter and in spring, floods frequently deposit new sediments. The organic-matter content generally is high, fertility is moderate, and the reaction is very strongly acid.

All of this acreage is forested. The natural vegetation consists mainly of cypress, blackgum, maple, ash, water oak, poplar, willow, and sweetgum. In places there is a thick understory of titi, alder, and bamboo.

Swamp (0 to 2 percent slopes) (Swc).—This miscellaneous land type occurs along streams and in Cross Swamp in the southeastern part of the county. Many areas could not be checked in detail because of difficulty of access. The surface layer consists partly of decomposed leaves, twigs, roots, and logs. In most places it is dark-gray to black loamy sand or silt loam. The subsurface layer consists of mixed mineral and organic materials that commonly are stratified or interbedded. It varies considerably both in color and texture but generally is dark-gray to black loamy sand, sand, or silt loam. It is finer textured with depth.

Swamp is flooded more often than once each year for periods of 1 to 6 months (fig. 8). The water table is within 15 inches of the surface for more than 10 months each year. Practically all of the acreage is forested and should be allowed to remain in forest. Swamp provides natural habitats for deer, squirrel, turkeys, and ducks, and there are numerous lakes that can be used for fish. (Capability unit VIIw-1; wildlife group 1)



Figure 8.—Swamp along the Alabama River. This land is in capability unit VIIw-1.

Tifton Series

The Tifton series consists of well-drained, level to gently sloping, pebbly soils that formed in marine sand, sandy clay loam, and sandy clay on uplands, mainly in the central part of the county. These soils are low in organic-matter content and natural fertility. They are very strongly acid. Permeability is moderate, and the available water capacity is medium. Tilth is good.

The Tifton soils commonly occur with the Fuquay, Irvington, Stilson, and Robertsdale soils. They contain more iron concretions throughout the solum and have a finer textured subsoil than the Fuquay soils. They lack the fragipan that is characteristic of the Irvington and Robertsdale soils, and they are better drained than either of those soils. They lack the thick surface layer of the Stilson and Fuquay soils.

The Tifton soils are extensive in the county. Most of the acreage is in cultivated crops and pasture. The natural vegetation consists of mixed pines and hardwoods and an understory of grasses.

Representative profile of Tifton loamy sand, 0 to 2 percent slopes, in a cultivated field, 2 miles north of the junction of Georgia Highway No. 203 and U.S. Highway No. 82 in Blackshear, on west side of Georgia Highway No. 203.

- Apcn—0 to 8 inches, dark grayish-brown (2.5Y 4/2) loamy sand; weak, fine, granular structure; very friable; many small roots; many iron concretions; very strongly acid; abrupt, wavy boundary.
- A2cn—8 to 13 inches, brownish-yellow (10YR 6/6) loamy sand; weak, fine, granular structure; very friable; few small roots; many iron concretions; very strongly acid; clear, wavy boundary.
- B21tcn—13 to 30 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, fine, subangular blocky structure; firm; many iron concretions; gradual, wavy boundary.
- B22tcn—30 to 40 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, distinct mottles of reddish yellow; moderate, fine, subangular blocky structure; firm;

soft plinthite makes up more than 10 percent of the material; very strongly acid; gradual, wavy boundary.

B23t—40 to 56 inches, reticulately mottled strong-brown (7.5 YR 5/8), yellow (2.5Y 7/6), and yellowish-brown (10YR 5/8) sandy clay loam; few stratified layers of sand; moderate, fine, subangular blocky structure; firm; very strongly acid; gradual, wavy boundary.

B24t—56 to 63 inches +, reticulately mottled red (2.5YR 5/6), brownish-yellow (10YR 6/8), and light-gray (10YR 7/2) sandy clay loam; few stratified layers of sand; moderate, fine, subangular blocky structure; firm; soft plinthite makes up more than 10 percent of the material; very strongly acid.

The Ap horizon ranges from grayish brown to dark grayish brown in color, and the A2 horizon from brownish yellow to light olive brown. In many places there is a B1 horizon of sandy loam or sandy clay loam. The B horizon ranges from yellowish brown to strong brown in color and from sandy clay loam to sandy clay in texture. The solum is more than 40 inches thick. The concretions vary considerably both in number and in size but make up more than 10 percent, by volume, of the soil material.

Tifton loamy sand, 0 to 2 percent slopes (TqA).—The surface layer of this soil is grayish-brown to dark grayish-brown loamy sand, 7 to 9 inches thick. The subsoil is yellowish-brown to strong-brown sandy clay loam. Iron concretions are on the surface and scattered throughout the soil material. Included in the areas mapped are small areas in which the surface layer is loamy fine sand or sandy loam and some areas in which the subsoil is sandy clay.

The soil is suited to many different kinds of crops. Corn, cotton, and tobacco (fig. 9) are suited if management is good. Oats, rye, and other small grain also are suited. Lupine, crotalaria, beggarweed, velvetbeans, and soybeans are well-suited legumes, and Coastal bermudagrass and bahiagrass are well-suited pasture grasses. Pecan trees grow well. Nursery crops and many truck crops are suitable.



Figure 9.—Tobacco growing on Tifton loamy sand, 0 to 2 percent slopes. This soil is in capability unit I-2.

This soil can be tilled intensively with a minimum risk of erosion. An example of a suitable cropping system is cotton grown year after year and a winter legume grown in alternate years.

Organic matter is depleted at a moderately rapid rate, even if management is good. Turning under all crop residues each year and including a cover crop in the cropping system are ways to maintain the organic-matter content and to increase the water-holding capacity.

This soil is well suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. Tobacco responds especially well to irrigation. An adequate supply of water can be obtained from specially constructed pit wells or ponds. (Capability unit I-2; woodland group 1; woodland grazing group 1; wildlife group 6)

Tifton loamy sand, 2 to 5 percent slopes (TqB).—This soil is on smooth slopes. The surface layer is dark grayish-brown loamy sand and is 4 to 8 inches thick. The subsoil is yellowish-brown to strong-brown sandy clay loam. In places the lower subsoil is mottled with reddish yellow, strong brown, and yellow. Numerous iron concretions are on the surface and throughout the soil material. Included in the areas mapped are small areas in which the surface layer is loamy fine sand or sandy loam and some areas in which the subsoil is sandy clay.

This soil is suited to many different kinds of crops. Corn, cotton, tobacco, and soybeans are suited if management is good. Oats, rye, and other small grains also are suited. Lupine, crotalaria, beggarweed, and velvetbeans are suitable legumes, and Coastal bermudagrass and bahiagrass are suitable pasture grasses. Pecans are well suited, and many truck crops and nursery crops are also well suited. Pine trees grow well.

Erosion is a slight to moderate hazard if this soil is cultivated. Measures that help to control erosion are contour farming, terracing, and stripcropping. These are practiced with a cropping system that includes annual close-growing crops, high-residue crops, or perennial crops. For example, a suitable cropping system in a field that is terraced and farmed on the contour is 1 year of cotton followed by 1 year of small grain and soybeans, then 1 year of corn, mulch planted.

Organic matter is depleted at a moderately rapid rate, even if management is good. Turning under crop residues and including cover crops in the rotation are ways to maintain the organic-matter content and to increase the water-holding capacity.

This soil is well suited to sprinkler irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. Tobacco responds especially well to irrigation. A supply of water can be obtained from specially constructed pit wells or ponds. (Capability unit IIe-2; woodland group 1; woodland grazing group 1; wildlife group 6)

Capability Classification of Soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to most horticultural crops or to rice and other crops that have special requirements. The soils are classified ac-

cording to degree and kind of permanent limitation, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible major reclamation projects.

In the capability system, all kinds of soils are grouped at three levels: the capability class, the subclass, and the unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In Class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In Class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products. In this county, there are no soils classified as VI or VIII.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In Class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it are subject to little or no erosion but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, in which are grouped soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally identified by numbers assigned at State level, for example, IIe-2 or IIIe-4. Since not all of the capability units in the State are represented in Pierce County, the numbering of the units may not be consecutive.

The eight classes in the capability system and the subclasses and units in Pierce County are described in the list that follows.

Class I. Soils that have few limitations that restrict their use.

Unit I-2. Nearly level, deep, well-drained sandy soil.

Class II. Soils that have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Subclass IIe. Soils subject to moderate erosion if they are not protected.

Unit IIe-2. Very gently sloping, well-drained sandy soil.

Subclass IIw. Soils that have moderate limitations because of excess water.

Unit IIw-2. Level, deep, moderately well drained and somewhat poorly drained loamy and sandy soils.

Subclass IIs. Soils that have moderate limitations because of moisture capacity.

Unit IIs-1. Nearly level, deep, droughty sandy soil.

Class III. Soils that have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.

Unit IIIe-4. Very gently sloping, deep, well-drained loamy soil that is eroded.

Subclass IIIw. Soils that have severe limitations because of excess wetness.

Unit IIIw-1. Nearly level, deep, moderately well drained and somewhat poorly drained sandy soils.

Unit IIIw-2. Level, deep, very poorly drained loamy soil in ponded areas.

Class IV. Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.

Subclass IVe. Soils subject to very severe erosion if they are cultivated and not protected.

Unit IVe-4. Gently sloping, deep, well-drained loamy soil that is eroded.

Subclass IVw. Soils that have very severe limitations because of excess water.

Unit IVw-4. Poorly drained and somewhat poorly drained sandy and loamy soils in slight depressions, on broad flats, and on river flood plains.

Unit IVw-5. Somewhat poorly drained soils with clayey subsoil; subject to very frequent flooding.

Subclass IVs. Soils that have very severe limitations because of moisture capacity.

Unit IVs-1. Nearly level or very gently sloping, deep, droughty sandy soil.

Class V. Soils that are not likely to erode, but that have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Subclass Vw. Soils too wet for cultivation; drainage or protection not feasible.

Unit Vw-2. Very poorly drained sandy soil in ponded areas and along drainageways.

Unit Vw-3. Nearly level, poorly drained or very poorly drained soils along intermittent drainageways.

Unit Vw-4. Level, poorly drained sandy soil on low ridges.

Class VI. Soils that have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover. (There are no class VI soils in Pierce County.)

Class VII. Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIw. Soils very severely limited by excess water.

Unit VIIw-1. Areas of swamp along rivers, large creeks, and bays.

Unit VIIs-1. Nearly level to gently sloping, deep, droughty sandy soil.

Class VIII. Soils and landforms that have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (There are no class VIII soils in Pierce County.)

Estimated Yields

Table 2 gives the estimated yields per acre of the principal crops on the soils of Pierce County. The estimates assume a high level of management and are based on records of actual yields, on yields obtained in long-term experiments, and on estimates made by agronomists who have had experience with the crops and soils of the county.

The yields given in table 2 are estimated average yields and are not for any particular farm or tract. They indicate the response to be expected if management is reasonably intensive. A high level of management includes carefully selecting the kind of crop to be grown and the cropping system to be used; preparing good seedbeds; seeding at recommended rates and at the proper time; adding liberal amounts of fertilizer and lime, according to soil tests; removing excess water from wet soils; contour tilling, strip cropping, or terracing very gently sloping soils; and sodding waterways to help control erosion.

In the following paragraphs are some specific management practices needed to obtain the yields shown in table 2. The rates given for plant nutrients are on a per acre basis.

Corn.—Plant enough seed to produce 10,000 to 15,000 plants per acre; apply 70 to 100 pounds of nitrogen (N) and 80 to 90 pounds each of phosphoric acid (P_2O_5) and potash (K_2O); return all crop residues to the soil.

Tobacco.—Grow crop on suitable soil; plant enough seed to produce 7,000 to 8,000 plants per acre; apply 65 to 85 pounds of nitrogen (N), 200 to 225 pounds of phosphoric acid (P_2O_5), and 225 to 260 pounds of potash (K_2O), according to the requirement of the individual soil based on soil tests; provide adequate control of plant diseases and insects. Split applications of fertilizer afford better utilization and less leaching.

Cotton.—Plant enough seed to produce 25,000 to 35,000 plants per acre; apply 30 to 50 pounds of nitrogen (N), plus 50 to 80 pounds as a side dressing, and 60 to 95 pounds each of phosphoric acid (P_2O_5) and potash (K_2O); provide adequate control of weeds, plant diseases, and insects.

Coastal bermudagrass.—Apply 20 to 25 pounds of nitrogen (N), plus 90 to 100 pounds in split applications as a top dressing, 40 to 50 pounds of phosphoric acid (P_2O_5), and 60 to 75 pounds of potash (K_2O). Although separate yields are given in table 2, Coastal bermudagrass can be managed for a combination of hay and pasture crops.

Bahiagrass.—Apply 25 to 30 pounds of nitrogen (N), plus 60 to 100 pounds in split applications as a top dressing, and 48 to 60 pounds each of phosphoric acid (P_2O_5) and potash (K_2O). Yearly applications are needed

TABLE 2.—Estimated yields per acre of the principal crops under a high level of management

[Yields are assumed to be without irrigation. Absence of yield indicates that the crop is not suited to the specified soil or generally is not grown on it]

Soil	Corn	Tobacco	Cotton	Coastal bermudagrass for hay	Coastal bermudagrass for pasture	Bahiagrass for pasture
	Bu.	Lb.	Lb. of lint	Tons	Cow-acre-days ¹	Cow-acre-days ¹
Albany sand, 0 to 2 percent slopes.....	60	2, 100	400	4. 4	220	225
Albany loamy fine sand, 0 to 2 percent slopes.....						
Carnegie sandy loam, 2 to 5 percent slopes, eroded.....	40	1, 800	450	5. 2	260	210
Carnegie sandy loam, 5 to 8 percent slopes, eroded.....				5. 0	250	200
Chipley sand, 0 to 2 percent slopes.....	50	1, 850	275	4. 8	240	180
Dunbar fine sandy loam, 0 to 2 percent slopes.....						
Fuquay loamy sand, 0 to 2 percent slopes.....	70	2, 100	600	5. 5	275	230
Irvington loamy sand, 0 to 2 percent slopes.....	80	2, 500	550	6. 6	330	260
Kershaw coarse sand, 0 to 5 percent slopes.....						
Lakeland sand, 0 to 5 percent slopes.....	35	1, 500		4. 0	170	160
Leefield sand, 0 to 2 percent slopes.....	65	2, 200	400	5. 3	260	235
Lumbree fine sandy loam.....						
Mascotte sand.....					200	220
Osier soils and Alluvial land.....						
Pelham sand, 0 to 2 percent slopes.....						
Portsmouth loam.....						
Robertsdale loamy sand, 0 to 2 percent slopes.....	80	2, 600	400	6. 0	300	250
Rutledge sand.....						
Stilson loamy sand, 0 to 2 percent slopes.....	70	2, 200	600	6. 0	300	255
Swamp.....						
Tifton loamy sand, 0 to 2 percent slopes.....	80	2, 500	850	7. 0	330	255
Tifton loamy sand, 2 to 5 percent slopes.....	70	2, 300	825	6. 3	320	240

¹ Cow-acre-days is a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multiplied by the number of days the pasture can be grazed during a single grazing season without injury to the sod. An acre of pasture that provides 30 days of grazing for 2 cows has a carrying capacity of 60 cow-acre-days.

to maintain favorable yields. This grass grows well on most soils in the county.

Use of the Soils for Woodland^a

This section interprets the soils of the county in terms of productivity for woodcrops and soil-related limitations in the production of woodcrops. About 73 percent of the acreage in Pierce County is woodland, most of which is farmer owned and operated. The principal commercial trees are longleaf pine on dry ridges; slash pine and loblolly pine on moist sandy flats; pine, gum, and yellow-poplar on small, poorly drained bottom lands; and gum and cypress in intermittent ponds. Both slash pine and longleaf pine are an important source of naval stores (turpentine, rosin, and other byproducts) (fig. 10), which account for a significant part of the farmer's income. There are local markets for pulpwood and sawtimber, including trees that have been "worked out" for naval stores.



Figure 10.—Collecting turpentine and rosin from pine trees on Lee field sand, 0 to 2 percent slopes.

^a NORMAN E. SANDS, forester, Soil Conservation Service, assisted in the preparation of this section.

Management of woodland can be planned more effectively if the soils are grouped according to those characteristics that affect the growth of trees and the management of the stand. For this reason, the soils of Pierce County have been placed in six woodland suitability groups. The "Guide to Mapping Units" at the back of this survey shows in which group the soils have been placed. Each group consists of soils that have about the same suitability for woodcrops, require about the same management, and have about the same potential productivity. In a discussion of each group, the estimated productivity and the limitations that affect management are given. The terms used to describe productivity and limitations are defined in the following paragraphs. Then, the woodland suitability groups are discussed.

Productivity is expressed as *site index*, which is the average height, in feet, that the dominant and codominant trees of a given species, growing on a specified soil, will reach in 50 years. The average site indexes given in this survey are based on measurements of trees of different species.

The average annual growth for southern pines is interpolated from tables 56, 88, and 152 in USDA Miscellaneous Publication 50 (5). Yearly growth is shown to age 50 for trees 8 inches or more in diameter in even-aged, fully stocked stands. Average yearly growth for hardwoods is adapted from table 7 in Agriculture Handbook No. 181 (10). Yearly growth is shown to age 50 for trees 12 inches or more in diameter in even-aged, fully stocked stands. All yields are in board feet by the Scribner log rule.

Given for each woodland group are site indexes for the principal kinds of trees on the soils of that group and, in addition, the average annual growth per acre in board feet (Scribner rule) calculated from the average site index.

Plant competition refers to the rate of invasion by unwanted trees, shrubs, and vines when openings are made in the canopy. Competition is *slight* if it does not prevent adequate natural regeneration and early growth or interfere with the normal development of planted seedlings. Competition is *moderate* if it delays the establishment and slows the growth of seedlings, either naturally occurring or planted, but does not prevent the eventual development of a fully stocked, normal stand. Competition is *severe* if undesirable plants prevent adequate restocking, either natural or artificial, without intensive preparation of the site and without special maintenance practices, including weeding.

Equipment limitations are rated according to the degree that drainage, slope, stoniness, soil texture, or other soil characteristics restrict or prohibit the use of conventional equipment in pruning, thinning, harvesting, or other woodland management. The limitation is *slight* if there is no restriction on the type of equipment or the time of the year that equipment can be used. It is *moderate* if the use of equipment is restricted by one or more unfavorable characteristics, such as slope, stones or other obstructions, seasonal wetness, instability, or risk of injury to roots of trees. The limitation is *severe* if special equipment is needed to perform normal management operations.

Seedling mortality refers to the expected loss of seedlings as a result of unfavorable soil characteristics or topographic features, not as a result of plant competition. Even if healthy seedlings of suitable species are planted or occur naturally in adequate numbers, some will not survive if

conditions are unfavorable. Ratings are based on the mortality of seedlings among the number normally planted for adequate stocking. *Slight* mortality is the loss of less than 25 percent of the seedlings; *moderate*, between 25 and 50 percent; and *severe*, more than 50 percent.

Woodland suitability group 1

This group consists of deep, well-drained soils that have a surface layer of sandy loam to loamy sand and a moderately permeable subsoil of sandy clay to sandy clay loam. Water and roots readily penetrate the soil material to great depths.

These soils are productive sites for slash pine and loblolly pine. They are moderately productive sites for longleaf pine. The average site index is 88 for slash pine, 86 for loblolly pine, and 73 for longleaf pine. The yearly growth, in board feet per acre (Scribner rule), is 500 for slash pine, 510 for loblolly pine, and 270 for longleaf pine. Slash pine and longleaf pine are a valuable source of naval stores. Loblolly pine is seldom used for this purpose.

Slash pine and longleaf pine are dominant in existing stands. If an opening is made in the canopy, weeding is necessary at least once to permit the normal growth of desirable seedlings. The water supply is sufficient to cause moderate competition from unwanted trees, shrubs, and vines.

Conventional equipment can be used the entire year, but there are about 2 months or more each year when the soils are wet enough to be moderately damaged by equipment.

Normally, enough water is available to insure the survival of more than 70 percent of the seedlings.

Woodland suitability group 2

This group consists of deep, moderately well drained and somewhat poorly drained soils that have a surface layer of loamy sand and a subsoil of sandy clay loam.

These soils are productive sites for slash pine, loblolly pine, water oak, and sweetgum. They are moderately productive sites for longleaf pine. The average site index is 90 for slash pine, 88 for loblolly pine, 75 for longleaf pine, 90 for sweetgum, and 90 for water oak. The yearly growth, in board feet per acre (Scribner rule), is 520 for slash pine, 540 for loblolly pine, 310 for longleaf pine, 260 for sweetgum, and 240 for water oak. Longleaf pine and slash pine are a valuable source of naval stores.

The water supply is sufficient to cause moderate competition from unwanted trees, shrubs, and vines. If an opening is made in the canopy, weeding is necessary at least once to permit the normal growth of desirable seedlings.

Conventional equipment can be used the entire year, but there are about 2 months or more each year when the soils are wet enough to be moderately damaged by equipment.

Normally, enough water is available to insure the survival of 70 percent or more of the seedlings.

Woodland suitability group 3

This group consists of somewhat poorly drained to very poorly drained soils. The surface layer ranges from sand to loam, and the subsoil from sand to clay.

The soils of this group that are not flooded are productive sites for loblolly pine, slash pine, sweetgum, and yellow-poplar. The site index for red oak and water oak is moderately high. Longleaf pine grows fairly well on the margin of ponds. Ponded areas are suitable for tupelo-

gum and baldcypress. The average site index is 88 for loblolly pine, 87 for slash pine, 75 for longleaf pine, 90 for yellow-poplar, 90 for sweetgum, 75 for red oak, and 75 for water oak. The yearly growth, in board feet per acre (Scribner rule), is 540 for loblolly pine, 490 for slash pine, 320 for longleaf pine, 310 for yellow-poplar, 310 for sweetgum, 150 for red oak, and 150 for water oak.

The supply of water is more than that required for the normal growth of pine. Excess water must be removed if pine and yellow-poplar are grown.

Because of the abundance of water, competition from water-tolerant trees, shrubs, and vines is severe. If an opening is made in the canopy, several weeding are necessary to allow the normal growth of desirable seedlings.

The use of conventional equipment is restricted to infrequent dry periods in midsummer. Drainage of excess surface water and construction of access roads are needed to permit the use of equipment.

Drainage and bedding normally are needed to establish both natural and planted seedlings.

Woodland suitability group 4

One excessively drained soil, Kershaw coarse sand, 0 to 5 percent slopes, is in this group. The coarse sand extends to a depth of more than 10 feet. Consequently, the available water capacity is extremely low. Both water and roots penetrate to great depths.

This soil is not suited to the economic production of woodcrops. Because drainage is excessive, less than 20 percent of planted seedlings survive. This is true even if sand pine or other drought-resistant trees are planted.

The use of conventional equipment is restricted during dry periods because of poor traction in the loose sand.

Woodland suitability group 5

One excessively drained soil, Lakeland sand, 0 to 5 percent slopes, is in this group. The sand extends to a depth of more than 6 feet. Consequently, the available water capacity is low. Water and root penetration is moderately deep.

This soil is a moderately productive site for longleaf pine and a moderately highly productive site for loblolly pine and slash pine (fig. 11). The average site index is



Figure 11.—Planted stand of pine growing on Lakeland sand, 0 to 5 percent slopes. This soil is in woodland suitability group 5.

78 for slash pine, 75 for loblolly pine, and 63 for longleaf pine. The yearly growth, in board feet per acre (Scribner rule), is 390 for slash pine, 386 for loblolly pine, and 190 for longleaf pine.

The control or elimination of cull trees, shrubs, and vines is necessary for planted seedlings to become established.

Although conventional equipment can be used at all times, during dry periods there are moderate restrictions on the use of equipment because of the dry sand.

Less than 50 percent of planted seedlings survive, and replanting is necessary to establish a stand. Direct seeding of longleaf pine generally is more successful than planting seedlings.

Woodland suitability group 6

The soils of this group are moderately well drained to poorly drained. They have a surface layer of sand to loamy fine sand and a subsoil of sand to sandy clay loam.

These soils are productive sites for slash pine (fig. 12) and loblolly pine and moderately productive sites for longleaf pine. The average site index is 91 for slash pine, 90 for loblolly pine, 66 for longleaf pine, and 60 for pond pine. The yearly growth, in board feet per acre (Scribner rule), is 530 for slash pine, 580 for loblolly pine, 220 for longleaf pine, and 160 for pond pine.



Figure 12.—Well-managed stand of slash pine on Lee field sand, 0 to 2 percent slopes. This soil is in woodland suitability group 6.

Generally, there is an abundance of water in these soils. Consequently, competition from unwanted plants is moderate or severe. If an opening is made in the canopy, weeding is necessary at least once to permit the normal growth of desirable seedlings.

There are about 2 months each year when the use of equipment is restricted because the soils are wet. Some damage is done to tree roots and soil structure if harvesting equipment is used at this time.

Drought in midsummer causes the loss of between 25 and 50 percent of the seedlings.

Use of the Soils for Woodland Grazing

All of the woodlands in Pierce County, except those on hardwood bottom lands and in swamps, have grazing potential. With reasonably good management, they produce enough grasses and forbs to support a number of livestock.

Many of the woodlands in the county are grazed part or all of the year. The length of the grazing season depends on the acreage in grazable woodland and on whether or not the woodland is fenced as a separate pasture unit or with planted pastures and fields. The production of forage on woodlands fluctuates according to (1) the age and composition of the stand, (2) the number of trees and shrubs per acre, (3) the accumulation of pine needles, (4) the control of unwanted hardwoods, and (5) the condition of the understory.

Cattle that are kept on woodland throughout the year should be fed livestock protein during winter months to supplement woodland forage, which becomes deficient in body-building minerals during the dormant season.

If hogs are grazed in a forest of longleaf pine, damage to the trees is likely because hogs eat the roots of longleaf pine, particularly those of the younger trees.

The amount of light received during the growing season influences both the quantity and the quality of woodland forage. For this reason, four canopy classes have been established to take the light factor into account in arriving at safe starting stocking rates for the woodland groups. They are as follows:

Overstory canopy classes	Percent of shaded ground at midday
Open -----	0 to 15
Sparse -----	16 to 30
Medium -----	31 to 45
Dense -----	46 to 60

Under the present methods of management, stands that cast more than 60 percent shade do not produce enough forage to make woodland grazing profitable.

With the exception of group 3, the grazing potential of each of the woodland suitability groups in the county is discussed in the following paragraphs. To find which woodland grazing group a specific soil is in, refer to the "Guide to Mapping Units" at the back of this survey.

Woodland grazing group 1

This group consists of deep, well-drained loamy and sandy soils that have a moderately permeable subsoil. Soil compaction caused by grazing is not a limitation.

Slash pine and longleaf pine are dominant in the stands. Because of the growth characteristics of these trees, particularly those of longleaf pine, there is sufficient sunlight to promote good growth of forage plants.

Grasses make up about 80 percent of the understory, and perennial forbs make up about 5 percent. The most prominent grasses are pinehill bluestem, switchgrass, pineland three-awn, broomsedge, bluestem, pineland dropseed, and low panicum. Indiangrass and big bluestem occur in places and are considered indicator plants because they are readily killed by overgrazing. Grassleaf goldaster is the most palatable forb. Gallberry and waxmyrtle make up about 10 to 15 percent of the understory but are more easily controlled by fire on these soils than on the soils of group 2. Saw-palmetto also grows on these soils.

The potential forage production, in pounds per acre air-dried, by canopy class is:

Open canopy-----	4,000 to 5,000
Sparse canopy-----	3,000 to 4,000
Medium canopy-----	2,000 to 3,000
Dense canopy-----	750 to 2,000

Woodland grazing group 2

This group consists of deep, moderately well drained and somewhat poorly drained soils that have a surface layer of loamy sand and a subsoil of sandy clay loam. Because the surface layer is sandy, soil compaction is not a problem under normal grazing pressure.

Sites on which slash pine, loblolly pine, or longleaf pine are dominant produce a variety of forage plants. The more important plants in well-managed stands are pinehill bluestem, toothachegrass, switchgrass, Florida three-awn, pineland three-awn, broomsedge bluestem, beaked panicum, several species of low panicums, chalky bluestem, and cutover muhly. These grasses make up 80 to 90 percent of the understory. Plumegrass occurs in the wetter areas. In densely shaded areas, the bluestems decrease in abundance, and only beaked panicum, low panicums, pineland three-awn, and other shade-tolerant species persist. Grassleaf goldaster is the most common forb, and gallberry is the most common low-growing shrub. Gallberry tends to resist burning and to increase in abundance, particularly in overgrazed woodlands. Saw-palmetto does well on these soils.

The potential forage production, in pounds per acre air-dried, by canopy class is:

Open canopy-----	3,500 to 4,000
Sparse canopy-----	2,500 to 3,500
Medium canopy-----	1,500 to 2,500
Dense canopy-----	500 to 1,500

Woodland grazing group 3

Woodland group 3 consists of soils that are too wet to be suitable for woodland grazing.

Woodland grazing group 4

This group consists of a deep, coarse-textured, excessively drained soil. This soil is low in natural fertility and is extremely low in available water capacity.

The climax plant community consists of turkey oak and bluejack oak, interspersed with sand pine and scrub hickory. The dominant grasses are pineland three-awn, pinehill bluestem, broomsedge, pineland dropseed, and a small amount of low panicum. The more common shrubs are runner oak, saw-palmetto, rosemary, and pricklypear.

The potential forage production, in pounds per acre air-dried, by canopy class is:

Open canopy-----	1,000 to 1,300
Sparse canopy-----	700 to 1,000
Medium canopy-----	400 to 700
Dense canopy-----	100 to 400

Woodland grazing group 5

This group consists of a deep, sandy, excessively drained soil. The sand extends to a depth of more than 6 feet.

The climax plant community is dominantly longleaf pine, scrub turkey oak, bluejack oak, blackjack oak, and an understory of herbaceous plants. Grasses make up about 75 to 80 percent of the understory vegetation. The principal grasses are pinehill bluestem, broomsedge, slender bluestem, pineland three-awn, pineland dropseed, lovegrass, paspalum, and low panicums. Perennial lespedeza, perennial tickclover, and grassleaf goldaster are the most common forbs. Small amounts of yucca and pricklypear also grow on these sites.

The potential forage production, in pounds per acre air-dried, by canopy class is:

Open canopy-----	1,500 to 2,000
Sparse canopy-----	1,000 to 1,500
Medium canopy-----	500 to 1,000
Dense canopy-----	100 to 500

Woodland grazing group 6

This group consists of moderately well drained to poorly drained soils that are wet or ponded for indefinite periods in winter. Consequently, grazing may be restricted at this time.

The climax plant community is dominantly loblolly pine, other pines, some hardwoods, and an understory of grasses, forbs, and shrubs. If the hardwoods are suppressed and the site is managed for pine, there is a significant increase in the understory vegetation.

Grass makes up about 65 to 70 percent of the understory. The principal grasses are pinehill bluestem, chalky bluestem, Florida paspalum, switchcane, toothachegrass, plumegrass, pineland three-awn, velvetgrass, beaked panicum, longleaf uniola, and low panicums. The principal forbs are perennial lespedeza, perennial tickclover, grassleaf goldaster, swamp sunflower, and deerstongue. If the forest is opened by logging or fire, waxmyrtle, gallberry, and sweetbay increase rapidly and are a problem to control because they sprout from the root crown. This part of the plant is protected by moisture when controlled burning normally is done.

The potential forage production, in pounds per acre air-dried, by canopy class is:

Open canopy-----	3,000 to 3,500
Sparse canopy-----	2,250 to 3,000
Medium canopy-----	1,500 to 2,250
Dense canopy-----	500 to 1,500

Use of the Soils for Wildlife

The soils of Pierce County produce food and cover for many kinds of wildlife. Bobwhites and doves are particularly numerous in the large cultivated areas. Squirrels, rabbits, opossums, raccoons, foxes, skunks, and songbirds are common throughout the county. Deer and wild turkeys find good habitats in the extensive, moist woodlands in the southeastern part of the county and in the swampy areas along the Satilla and Alabama Rivers. Wild

ducks, minks, and otters also find suitable habitats along these rivers and, to some extent, in other parts of the county. The waters of the county are well stocked with largemouth bass, bluegill bream, crappie, catfish, and jack. Many warm-water ponds provide good fishing if properly managed.

The work unit conservationist of the Soil Conservation Service maintains up-to-date technical guides on important kinds of wildlife as well as on plants suitable for food and cover. He can help the farmer plan good habitats for wildlife suited to his land.

Food and Cover for Wildlife

Following is a summary of the food and habitat needs of most of the important kinds of wildlife in the county.

Bobwhites.—Choice foods for bobwhites are acorns, blackberries, browntopmillet, bullgrass, wild black cherries, corn, cowpeas, dewberries, beggarweed, flowering dogwood, annual lespedeza, bicolor lespedeza, peanuts, pecans, pine mast, common ragweed, soybeans, sweetgum, and tickclover. Bobwhites also eat many insects. Their food must be close to vegetation that offers protection from predators and shelter from extreme heat and adverse weather.

Doves, mourning.—Choice foods for doves are browntopmillet, bullgrass, corn, Japanese millet, pine mast, common ragweed, peanuts, and sweetgum seeds. Doves eat no insects, green leaves, or fruits. They drink water daily.

Ducks.—Choice foods for ducks are acorns, browntopmillet, Japanese millet, chufa, corn, and smartweed seeds. Although ducks occasionally eat acorns and corn on dry land, their food generally needs to be covered with water.

Turkeys, wild.—Turkeys survive only in large wooded areas, generally 2,000 acres or more in size. They drink water daily and often roost in large trees over or near water. Choice foods are insects, acorns, bahiagrass seeds, bullgrass, blackberries, dewberries, browntopmillet, chufa, clover leaves, corn, cowpeas, peanuts, flowering dogwood, gallberries, wild grapes, oats, pecans, pine mast, rye, and soybeans.

Nongame birds.—Nongame birds differ greatly in their choice of food. Some eat only insects; others eat only seeds; others eat fruits and nuts; and a few eat insects, nuts, and fruits.

Deer.—Choice foods for deer are acorns, bahiagrass, clover, chufa, corn, cowpeas, greenbrier, annual lespedeza, bicolor lespedeza, oats, saw-palmetto, soybeans, rye, and yaupon. Woodlands of 500 acres or more generally provide adequate cover.

Rabbits.—Choice foods are clover, summer and winter grasses, and other succulent plants. Rabbits need a thicket of blackberry, plum, or other plants for cover.

Squirrels.—Choice foods are acorns, blackgum seed, black cherry, chinquapin, chufa, corn, flowering dogwood seed, magnolia seed, peanuts, pecans, pine mast, cypress, and tupelo fruit.

Fish.—The principal fish in the Satilla and Alabama Rivers are bluegill, redbreast, bass, and channel catfish. Farm ponds generally are stocked with bluegill and bass. The choice foods of bluegill and redbreast are aquatic worms, insects, and larvae. Bass and channel catfish feed chiefly on small fish. The supply of food for fish depends

largely on the fertility of the water, on the kind of soil in the watershed, and, to some extent, on the kind of soil at the bottom of the pond or stream. Consequently, most ponds in the county need to be fertilized and limed if they are to produce enough algae to feed large numbers of worms and other organisms and thus provide sufficient food for fish.

Wildlife Suitability Groups

The soils in Pierce County have been placed in seven wildlife groups according to their suitability as habitats for wildlife. These groups are described in the following paragraphs. To determine in which group a soil has been placed, refer to the "Guide to Mapping Units" at the back of this survey.

Wildlife suitability group 1

In this group are poorly drained and very poorly drained soils in drainageways, swamps, and slight depressions and on broad flats and flood plains throughout the county. The surface layer ranges from sand to loam, and the subsoil from stratified layers of sand and silt to sandy clay. The slope ranges from 0 to 2 percent. More than once each year, these soils are flooded for a period of 7 days to 6 months. The water table is at or within 15 inches of the surface for more than 6 months each year.

The soils in this group are well suited to blackgum, baldcypress, oak, smartweed, sweetbay, magnolia, tupelo, and pine, which provide choice food for wildlife. Cover for wildlife is plentiful because all of the acreage is wooded. Many tracts are large enough to support deer and turkey. Low dikes can be constructed in some areas to provide suitable ponds for ducks.

Wildlife suitability group 2

This group consists of a poorly drained soil on low, nearly level uplands, mainly in the southeastern part of the county. The surface layer is sand to a depth of about 16 inches. It is underlain by sand that is partly cemented by organic matter. The water table is within 15 inches of the surface most of the time and within 40 inches of the surface during dry periods. Plants that produce choice food for wildlife are pine, oak, waxmyrtle, and gallberries. Because of its position and sandy texture, this soil cannot be effectively flooded for duck fields. Practically all the acreage is wooded.

Wildlife suitability group 3

In this group are moderately well drained to somewhat poorly drained sandy soils on low, nearly level uplands and flood plains in the central, north-central, and western parts of the county. These soils are sand or loamy fine sand to a depth of 20 to more than 40 inches. They have a fluctuating water table that is within 15 inches of the surface from 4 to 8 months each year and within 30 inches of the surface from 2 to 6 months each year.

The soils of this group are suited to plants that provide choice food for several different kinds of wildlife. They are well suited to pecans, pine, oak, ragweed, palmetto, smartweed, soybeans, waxmyrtle, bahiagrass, beggarweed, browntopmillet, chinquapin, chufa, clover, corn, gallberry, and grapes. Cover for wildlife is plentiful.

About half the acreage is in cultivated crops and pasture. The rest is wooded. Some tracts are large enough to support deer and turkey, although in places water holes are needed. Because of their sandy texture, these soils generally cannot be flooded for duck fields.

Wildlife suitability group 4

This group consists of moderately well drained and somewhat poorly drained soils on uplands and of somewhat poorly drained soils on flood plains, in the north-central, central, and western parts of the county. The surface layer is loamy sand to fine sandy loam, and the subsoil is friable to very firm sandy clay loam to clay. The water table is at a depth of 10 to 30 inches for more than 6 months each year.

These soils are suited to plants that provide choice food for bobwhites, turkeys, doves, rabbits, and other kinds of wildlife. Such plants include bahiagrass, beggarweed, blackberries, dewberries, browntopmillet, cherries, chinquapin, chufa, clover, corn, cowpeas, gallberries, grapes, lespedeza, oak, paspalum, magnolia, peanuts, pecans, pine, ragweed, rye, soybeans, tickclover, and waxmyrtle. Favorable sites for ponds are available in many of the natural drains.

Wildlife suitability group 5

In this group are well-drained soils on uplands, mainly in the central part of the county. The surface layer is sandy loam, and the subsoil ranges from sandy clay loam to sandy clay. The slope is between 2 and 8 percent. Most of the acreage has been cultivated, but some has reverted to forest.

These soils are suited to plants that provide choice food for several different kinds of wildlife. Pecans, pine, rye, black cherry, dogwood, magnolia, and oak can be established if moderate practices are used to help control erosion.

Wildlife suitability group 6

This group consists of well-drained soils on uplands, mainly in the central and northern parts of the county. These soils have a surface layer of loamy sand and a moderately permeable subsoil of sandy clay loam. The slope ranges from 0 to 5 percent. Most of the acreage is cultivated.

The soils of this group are suited to plants that provide choice food for bobwhites, doves, rabbits, and other kinds of wildlife. Such plants include bahiagrass, blackberries, dewberries, browntopmillet, black cherry, chufa, crimson clover, corn, cowpeas, dogwood, magnolia, oak, peanuts, pecans, pine, rye, and soybeans. Good sites for ponds are available in many of the natural drains.

Wildlife suitability group 7

In this group are excessively drained soils on upland ridges along the Satilla and Alabama Rivers. These soils are sand or coarse sand to a depth of several feet. The slope ranges from 0 to 5 percent.

The soils of this group support adequate cover for wildlife, but they are limited in the production of wildlife food because they are low or very low in available water capacity and in natural fertility. Supplemental food can be produced more economically on adjacent soils. Drinking water must also be obtained from adjacent areas.

Use of the Soils for Engineering⁴

Soils are natural materials that differ greatly in properties from one location to the next and even within the same area. Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, water storage facilities, erosion control structures, drainage systems, and sewage disposal systems. The soil properties most important to engineers are shear strength, drainage, grain size, plasticity, and permeability to water. Shrink-swell characteristics, depth to the water table, depth to bedrock, topography, available water capacity, flood hazard, and degree of acidity or alkalinity are also important.

Information in this section can be used by engineers to—

1. Make studies that will aid in selecting and developing sites for industrial, business, residential, and recreational purposes.
2. Make preliminary estimates of soil properties that are significant in the planning of agricultural drainage systems, farm ponds, irrigation systems, terraces and diversions, waterways, and other structures for conserving soil and water.
3. Make preliminary evaluations that will aid in selecting locations for highways, airports, pipelines, and cables and in planning detailed investigations at selected locations.
4. Locate probable sources of sand and gravel for use in construction.
5. Correlate performance of engineering structures with types of soil and thus gain information that will be useful in planning the design and maintenance of the structures.
6. Determine the suitability of the soils for cross-country movement of vehicles and construction equipment.
7. Supplement the information obtained from other published maps and reports and aerial photographs for the purpose of making maps and reports that can be readily used by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

With the use of the soil map for identification, the engineering interpretations reported here can be useful for many purposes. It should be emphasized that they may not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and excavations deeper than the depths of layers here reported. Even in these situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

In addition to the information given in this section, information of value in planning engineering works is given throughout the text, particularly in the sections "Descriptions of the Soils" and "Formation and Classification of Soils." Some terms used by soil scientists may be unfamiliar to engineers, and some words have special meanings in soil science. Many of these terms are defined in the Glossary at the back of this survey.

⁴ W. H. PARK, area engineer, Soil Conservation Service, assisted in writing this subsection.

Engineering classification systems

Most highway engineers classify soil material in accordance with the system approved by the American Association of State Highway Officials (AASHO) (2). In this system soil materials are classified in seven principal groups. The groups range from A-1, consisting of gravelly soils of high bearing capacity, to A-7, consisting of clay soils that have low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. These range from 0 for the best materials to 20 for the poorest. The group index is shown in parentheses after the soil group symbols in table 3.

Some engineers prefer the Unified soil classification system (11). In this system soil materials are identified as coarse grained (eight classes), fine grained (six classes), or highly organic.

The classification of soil material by either the AASHO or the Unified system identifies the material according to textural and plasticity characteristics. This classification permits the engineer to make a rapid appraisal of a soil material by comparing it with more familiar soils that have the same classification.

Engineering test data

Soil samples from six profiles representing two series were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. The results of these tests are given in table 3. The samples for each series were from different locations and were taken at a depth of 72 inches or less. The data therefore may not be adequate for estimating the properties of the soils in deeper cuts.

In the moisture-density (compaction) test, soil material is compacted into a mold several times with a constant compactive effort, each time at a successively higher moisture content. The density of the compacted material increases as the moisture content increases until the optimum moisture content is reached. After that the density decreases with increase in moisture content. The highest density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in construction because, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

The volume changes listed in table 3 indicate the amount of shrinkage and swelling in samples prepared at optimum moisture content and then subjected to drying and wetting. The sum of these two values gives the total volume change that can occur in the particular soil.

The results of the mechanical analysis may be used to determine the relative proportions of the different size particles that make up the soil sample. The percentage of fine-grained material obtained by the hydrometer method should not be used to determine soil textural classes.

The tests to determine liquid limit and plastic limit measure the effect of water on the consistence of soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid and then to a plastic state. As the moisture content is further increased, the material changes from a

plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Estimated properties of the soils

Table 4 lists the soil series in the county and gives some soil properties significant in engineering. It classifies the soil material in the principal horizons according to both the textural classification of the U.S. Department of Agriculture and the classification systems used by engineers. Also given are estimates of grain-size distribution, permeability, available water capacity, and shrink-swell potential. The estimates in table 4 are based on the test data in table 3, on examination in the field, and on experience with the same kinds of soils in other counties. These estimates apply only to the soils in Pierce County.

The depth from the surface shown in table 4 generally is the depth given for horizons in the profiles described in the section "Descriptions of the Soils."

Permeability is that quality of the soil that enables it to transmit water and gases. It is measured quantitatively in terms of rate of flow of water through a cross-section of saturated soil in a specified time. The rate is usually expressed as inches per hour.

Available water capacity is the amount of water a soil can hold and make available to plants. It is the numerical difference between the percentage of water at field capacity (approximated at $\frac{1}{3}$ atmosphere of tension for silty and clayey soils and at $\frac{1}{10}$ atmosphere of tension for sandy soils) and the percentage of water at the time plants wilt (approximated at 15 atmospheres of tension). The rate is expressed as inches of water per inch of soil depth.

The ratings for shrink-swell potential indicate the volume change resulting from the shrinking of the soil when it dries and the swelling of the soil as it takes up moisture. In general, soils classified as CH and A-7 have high shrink-swell potential. Clean sands and gravel and soils having small amounts of nonplastic to slightly plastic material have low shrink-swell potential.

Properties were not estimated for Alluvial land or Swamp, because the characteristics of these land types vary widely within a few feet and from one area to another.

All of the soils in Pierce County are very strongly acid if not limed.

Engineering interpretations

Table 5 gives, for each soil series, suitability ratings for specific engineering purposes and shows soil features that affect the location of highways or the installation of engineering structures that help to conserve soil and water on farmlands. These interpretations are based on limited test data, on numerous field observations, and on experience of persons familiar with the soils.

The ratings good, fair, and poor are used to show the suitability of the soils as a source of topsoil, sand, and road fill.

TABLE 3.—*Engineering*

[Tests performed by the State Highway Department of Georgia in cooperation with U.S. Department of Commerce, Bureau of

Soil name and location	SCS report number S-63-Ga- 113-	Depth	Horizon	Moisture-density data ¹		Volume change ²		
				Maximum dry density	Optimum moisture	Shrink- age	Swell	Total volume change
Irvington loamy sand:		In.		Lb. per cu. ft.	Pct.	Pct.	Pct.	Pct.
0.25 mile E. of Pierce-Ware County line and 0.25 mile N. of Black- shear-Walvertown road. (Modal)	1-1 1-3 1-4 1-5	0 to 8 12 to 26 26 to 33 33 to 50	Ap----- B2ten----- Bxcn----- B3tg-----	113 121 115 108	9 11 14 17	0.0 3.2 5.6 5.0	8.4 2.4 1.4 8.1	8.4 5.6 7.0 13.1
2 miles S. of Youmans Cemetery and 2 miles W. of Youmans Cemetery road. (Variation toward Robertsdale)	2-1 2-3 2-4 2-5	0 to 8 11 to 20 20 to 27 27 to 50	Ap----- B2ten----- Bxcn----- B3tg-----	123 113 125 120	8 10 9 11	.5 .0 1.2 2.9	2.2 4.3 4.2 1.1	2.7 4.3 5.4 4.0
1 mile S. of Youmans Cemetery and 1 mile W. of Youmans Cemetery road. (Variation toward Tifton)	3-1 3-3 3-4 3-5	0 to 9 14 to 25 25 to 33 33 to 55	Ap----- B2ten----- Bxcn----- B3t-----	120 120 126 116	8 11 8 13	.0 3.2 .8 5.0	3.1 5.2 2.9 3.7	3.1 8.4 3.7 8.7
Lumbee fine sandy loam:								
3 miles S. of Pine Grove Church and 0.1 mile N. of Alabama River. (Modal)	4-1 4-4 4-5	0 to 6 15 to 29 29 to 50	A1----- B22tg----- C-----	103 119 122	15 12 10	3.8 6.6 .3	9.0 3.5 .4	12.8 10.1 .7
0.2 mile S. of Raulerson Memorial Church and 2 miles W. of Brantley-Pierce County line. (Finer textured B horizon than modal)	5-1 5-3 5-4	0 to 6 14 to 34 34 to 50	A----- B2tg----- C-----	107 116 116	13 13 10	.4 3.3 .8	6.6 4.0 2.8	7.0 7.3 3.6
1.5 miles NW. of U.S. Highway 82, on E. bank of Satilla River. (Coarser textured B horizon than modal)	6-4 6-5	18 to 50 50 to 60	B2tg----- C-----	122 106	11 11	3.3 .0	3.9 3.3	7.2 3.3

¹ Based on the AASHTO Designation: T 99-57, Method A and C (2).² Based on "A System of Soil Classification" by W. F. Abercrombie (1).³ Mechanical analysis according to the AASHTO Designation: T 88. Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters

The suitability of a soil for use as topdressing depends primarily on its capacity to support good plant growth on lawns, on road shoulders, and in other areas that require a protective cover of vegetation.

The suitability of a soil as a source of industrial sand depends largely on the size of the soil particles, on the thickness of the soil material, and on the amount of organic material in the soil.

The suitability of the soil for use as road fill depends mainly on texture, moisture content, compaction characteristics, and susceptibility to erosion. Highly plastic soils that have a high water content are rated poor. Coarse sands are also rated poor, because of poor trafficability. Soils that consist of a mixture of clay and sand are stable, are readily compacted, and can support heavy loads without changing form.

Features to consider in selecting highway locations are drainage, seepage, flooding, plasticity, and instability of slopes. Poor drainage and flooding are the common limiting factors in Pierce County. All of the low-lying soils of the county have a high water table, and most of those soils are subject to flooding to some extent.

In evaluating the soils for farm ponds, the features to consider are permeability, texture, depth to the water table, thickness of the profile, and topography. The ratings apply to dam-type ponds and to ponds constructed by a combination of damming and excavation. Separate ratings are given for the reservoir area and for the embankment.

Some soils have to be drained before they can be cultivated. The availability of outlets is an important feature to consider in planning drainage.

Irrigation is affected by the rate of infiltration, permeability, available water capacity, thickness of the profile, and slope. The features shown in table 5 are primarily those that affect sprinkler irrigation.

Pits for irrigation water are generally dug in the Irvington, Robertsdales, Leefield, and other soils that are moderately well drained or somewhat poorly drained. A detailed field examination is needed before pits are dug to determine the permeability of the substrata, the stability of the side slopes, and the presence of water-bearing sand within 10 to 16 feet of the surface. The size of the pit is determined by the number of acres to be irri-

test data

Public Roads (BPR), in accordance with standard procedures of the American Association of State Highway Officials (AASHO) (2)]

Mechanical analysis ³											Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—				AASHO			Unified ⁴	
1½-in.	1-in.	¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
-----	100	99	93	92	75	16	10	5	3	2	<i>Pct.</i>			
-----	100	99	85	84	67	28	25	22	18	16	⁵ NP	NP	A-2-4(0)---	SM.
-----	100	99	87	83	68	31	28	26	22	19	23	11	A-2-6(0)---	SC.
-----	-----	-----	100	99	84	38	36	34	32	28	26	12	A-2-6(0)---	SC.
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	34	17	A-6(2)-----	SC.
-----	-----	100	96	94	88	31	24	16	11	9	NP	NP	A-2-4(0)---	SM.
-----	-----	-----	98	98	85	24	17	10	5	3	NP	NP	A-2-4(0)---	SM.
100	99	96	80	78	71	29	24	19	16	14	21	10	A-2-4(0)---	SC.
-----	100	99	88	85	78	35	29	23	20	19	24	11	A-2-6(0)---	SC.
100	99	99	93	92	71	23	15	7	4	3	NP	NP	A-2-4(0)---	SM.
-----	100	99	87	85	71	36	29	22	20	17	24	8	A-4(0)-----	SC.
-----	100	99	80	78	64	28	18	15	12	9	NP	NP	A-2-4(0)---	SM.
-----	-----	100	88	85	73	38	31	27	23	20	31	14	A-6(2)-----	SC.
-----	-----	-----	-----	100	91	50	38	28	18	13	NP	NP	A-4(3)-----	SM.
-----	-----	-----	-----	100	99	57	46	38	29	21	22	11	A-6(5)-----	CL.
-----	-----	-----	-----	100	97	36	29	23	17	13	NP	NP	A-4(0)-----	SM.
-----	-----	-----	100	98	79	43	30	19	11	6	NP	NP	A-4(1)-----	SM.
-----	-----	-----	100	99	68	47	37	34	30	26	29	17	A-6(5)-----	SC.
-----	-----	-----	100	99	28	21	19	18	17	16	37	19	A-2-6(0)---	SC.
-----	-----	-----	-----	100	87	36	28	24	20	17	20	9	A-4(0)-----	SC.
-----	-----	-----	-----	100	57	6	5	4	2	2	NP	NP	A-2-4(0)---	SP-SM.

in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for use in naming textural classes for soils.

⁴ SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of the A-line are to be given a borderline classification. An example of borderline classification obtained by this use is SP-SM.

⁵ Nonplastic.

gated and by the recharge rate of the water-bearing strata. Generally, a pit from which 2 acres is to be irrigated should be 53 feet long and 24 feet wide at the bottom, and the charge rate should be sufficient to cause water to rise at least 6 feet in the pit. The water-bearing strata should recharge the pit at a weekly rate of 1½ inches of water per acre.

Features to be evaluated before constructing terraces, diversions, and waterways or before leveling are the thickness of the profile, the depth of the root zone, available water capacity, internal drainage, texture, and erodibility.

Use of the soils for selected nonfarm purposes

This subsection interprets the soil properties that affect the use of the soils of the county as sites for residences, as filter fields for septic tank systems, as recreation areas, and as sites for light industries. Table 6 shows the degree and kind of limitation of the soils for such use. Soils with *slight* limitations can be used essentially as they are; soils with *moderate* limitations are of questionable suitability and require some modification or some change in design to compensate for unfavorable soil properties;

soils with *severe* limitations generally are not suitable and, if used, require intensive modifications or adjustments in design to compensate for unfavorable soil properties.

Residences are defined as dwellings of three stories or less. Features to consider in evaluating the soils as sites for residences are depth to the seasonal high water table, hazard of flooding, shrink-swell behavior, and slope.

Soils suitable for use as filter fields for septic tanks are those that absorb effluent at about the same rate as it is introduced into the filter field, but the soils should not be so porous that shallow wells and underground water supplies are likely to be contaminated. Suitability depends on texture, percolation rate, internal drainage, flood hazard, and depth to the water table. Soils that absorb effluent at a satisfactory rate during dry periods but not during wet periods have moderate limitations. Soils that are subject to flooding or have a percolation rate slower than 75 minutes per inch have severe limitations. The ratings shown in table 6 can be used as a guide to locate suitable sites but do not eliminate the need for percolation tests.

TABLE 4.—*Estimated properties of the soils*

Soil series and map symbols	Depth from surface	Classification			Percentage passing sieve—			Permeability
		Dominant USDA texture	Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)	
Albany (AdA, AsA).	<i>Inches</i> 0 to 44 44 to 67	Sand Sandy loam	SP-SM, SM SM	A-3, A-2 A-2-6	100 100	100 100	7 to 15 20 to 35	<i>Inches per hour</i> 2. 0 to 6. 0. 63 to 2.
Alluvial land. All properties are variable.								
Carnegie (CoB2, CoC2).	0 to 6 6 to 44 44 to 60	Sandy loam Sandy clay loam Coarse sandy loam.	SM SC SM	A-2 A-4, A-6 A-2	85 to 95 90 to 98 100	85 to 95 90 to 95 100	20 to 35 35 to 50 20 to 35	2. 0 to 6. 0. 63 to 2. 2. 0 to 6.
Chipley (CmA).	0 to 65	Sand	SM	A-2-4	100	100	10 to 25	> 6.
Dunbar (DmA).	0 to 14	Fine sandy loam.	SM, ML	A-4	100	100	35 to 65	0. 63 to 2.
	14 to 36	Clay or sandy clay.	CL, ML	A-7, A-6	100	100	65 to 75	0. 2 to 0.
	36 to 54	Sandy clay loam	CL, ML-CL	A-4, A-6	100	100	50 to 80	0. 63 to 2.
Fuquay (FsA).	0 to 22 22 to 65	Loamy sand Sandy clay loam	SM SC	A-2 A-4	100 100	100 100	15 to 25 35 to 45	2. 0 to 6. 0. 63 to 2.
Irrington (IjA).	0 to 12 12 to 26	Loamy sand Sandy clay loam	SM SC, SM	A-2-4 A-4, A-2-6	190 to 95 185 to 98	190 to 95 185 to 98	15 to 34 25 to 40	2. 0 to 6. 0. 63 to 2.
	26 to 33	Sandy clay loam	SC, SM	A-2-4, A-2-6	180 to 90	175 to 85	28 to 35	0. 2 to 0.
	33 to 60	Clay loam	SC	A-6, A-2-6	185 to 100	185 to 99	30 to 40	0. 63 to 2.
Kershaw (KkB).	0 to 66	Coarse sand	SP, SP-SM	A-3	100	100	5 to 10	> 6.
Lakeland (LpB).	0 to 68	Sand	SP, SP-SM	A-2, A-3	100	100	10 to 15	> 6.
Leefield (LiA).	0 to 32 32 to 65	Sand Sandy clay loam	SP-SM, SM SM, SC	A-2, A-3 A-4, A-2-6	100 100	100 95 to 100	10 to 20 30 to 45	> 6. 0. 63 to 2.
Lumbee (Lum).	0 to 6 6 to 15 15 to 29 29 to 50	Fine sandy loam Sandy clay loam Sandy clay Sandy loam	SM, ML CL, SC CL, SC SM, SC	A-4 A-6 A-6, A-4 A-4, A-2-6	100 100 100 100	98 to 100 99 to 100 98 to 100 99 to 100	40 to 55 35 to 60 35 to 65 20 to 40	0. 63 to 2. 0. 2 to 0. 0. 2 to 0. 0. 63 to 2.

Mascotte (MnA).	0 to 16	Sand-----	SP-SM, SM--	A-3, A-2--	100	100	10 to 20	0.63 to >
	16 to 21	Sand-----	SM-----	A-2-----	100	100	15 to 25	0.63 to >
	21 to 48	Sand-----	SP-SM, SM--	A-3, A-2--	100	100	10 to 20	0.63 to >
	48 to 64	Sandy clay loam--	SC-----	A-4-----	100	100	35 to 45	0.63 to >
Osier (Osa). All properties of Alluvial land part of Osa are vari- able.	0 to 12	Sand-----	SM-----	A-2-----	100	100	7 to 12	2.0 to
	12 to 52	Sand-----	SW-----	A-3-----	100	100	5 to 12	2.0 to
Pelham (PaA).	0 to 37	Sand-----	SM-----	A-2-4-----	100	100	15 to 25	2.0 to
	37 to 66	Sandy loam and sandy clay loam.	SC-----	A-4, A-2-6	100	100	30 to 45	0.63 to
Portsmouth (Por).	0 to 16	Loam-----	SC, CL-----	A-4-----	100	100	40 to 60	0.63 to
	16 to 54	Sandy clay loam--	CL-----	A-4, A-6--	100	100	50 to 65	0.2 to
Robertsdale (RIA).	0 to 15	Loamy sand-----	SM-----	A-2-4-----	185 to 95	185 to 95	20 to 25	2.0 to
	15 to 24	Sandy loam-----	SM-----	A-2, A-4--	185 to 95	185 to 95	30 to 40	2.0 to
	24 to 33	Sandy clay loam--	SC-----	A-4-----	180 to 90	180 to 90	40 to 50	0.63 to
	33 to 64	Sandy clay loam--	SC-----	A-4-----	185 to 95	185 to 95	40 to 50	0.2 to
Rutlege (RkA).	0 to 65	Sand-----	SM, SP-SM--	A-3, A-2--	100	100	10 to 15	2.0 to
Stilson (SeA).	0 to 26	Loamy sand-----	SM-----	A-2-----	185 to 90	185 to 90	15 to 25	2.0 to
	26 to 42	Sandy clay loam--	SC-----	A-2, A-4--	185 to 90	185 to 90	30 to 45	0.63 to
	42 to 52	Sandy clay loam--	SC-----	A-2, A-4--	100	100	30 to 45	0.63 to
Swamp (Swa). All properties are variable.	0 to 13	Loamy sand-----	SM-----	A-2-4-----	165 to 75	165 to 75	15 to 25	2.0 to
	13 to 40	Sandy clay loam--	SC, CL-----	A-2-6, A-6	165 to 75	165 to 75	40 to 65	0.63 to
	40 to 63	Sandy clay loam--	SC, CL, ML- CL.	A-6, A-7--	90	90	40 to 65	0.63 to

¹ Mostly iron concretions.

TABLE 5.—*Interpretation*

Soil series and map symbols	Suitability as source of—			Soil features affecting—		
	Topsoil	Sand	Road fill	Highway location	Reservoir area	Embankment
Albany (AdA, AsA)-----	Fair-----	Fair-----	Fair to good..	High water table; subject to flooding; slopes easily eroded.	Rapid permeability; excessive seepage.	Rapid permeability; poor strength and stability.
Alluvial land. All properties are variable.						
Carnegie (CoB2, CoC2)-----	Poor-----	Poor-----	Fair to good..	Fair to good stability; seepage in some areas.	Moderate seepage; moderately slow permeability.	Moderate to moderately slow permeability.
ChIPLEY (CmA)-----	Fair-----	Fair-----	Fair to good..	High water table---	Rapid permeability; excessive seepage.	Rapid permeability; poor strength and stability.
Dunbar (DmA)-----	Fair-----	Poor-----	Fair-----	Seasonal high water table; moderately slow permeability; subject to flooding.	Moderately slow permeability; slow seepage; subject to flooding.	Moderately slow permeability; moderate shrink-swell potential; subject to flooding.
Fuquay (FsA)-----	Good-----	Fair-----	Fair to good..	Soil properties favorable; good strength and stability.	Moderate permeability in subsoil; moderately slow seepage.	Moderately rapid permeability in surface layer, moderate in subsoil; good strength and stability.
Irvington (IjA)-----	Fair-----	Poor-----	Fair to good..	Good stability-----	Moderate permeability; slow seepage.	Moderate permeability; moderate shrink-swell potential.
Kershaw (KkB)-----	Poor-----	Good; poorly graded.	Poor; good if confined.	Unstable slopes-----	Very rapid permeability; excessive seepage.	Poor strength and stability.
Lakeland (LpB)-----	Poor-----	Fair to good..	Good-----	Unstable slopes-----	Rapid permeability; excessive seepage.	Poor strength and stability.
Leefield (LiA)-----	Fair-----	Fair-----	Fair to good..	High water table---	Rapid permeability; excessive seepage.	Rapid permeability; poor strength and stability.
Lumbee (Lum)-----	Fair-----	Poor-----	Poor-----	High water table; subject to flooding.	Slow to moderate seepage; subject to flooding.	Poor to fair strength and stability; subject to flooding.
Mascotte (MnA)-----	Poor-----	Fair-----	Fair to good..	High water table---	Rapid permeability; excessive seepage.	Poor strength and stability.
Osier (Osa)-----	Poor-----	Poor-----	Poor-----	Subject to flooding; high water table.	Rapid permeability; excessive seepage.	Poor strength and stability.
All properties of Alluvial land part of Osa are variable.						
Pelham (PaA)-----	Fair-----	Fair-----	Fair to good..	Seasonal high water table; slopes easily eroded; poor strength and stability.	Rapid permeability in surface layer, moderate in underlying layers.	Rapid permeability; low shrink-swell potential; poor strength and stability.

of engineering properties

Soil features affecting—Continued					
Agricultural drainage	Irrigation	Excavated pits for irrigation	Terraces and diversions	Waterways	Land leveling
Seasonal high water table; subject to frequent flooding.	Not cultivated-----	Unstable slopes; not cultivated.	Not needed; level; subject to flooding.	Not cultivated; subject to flooding.	Not cultivated; subject to flooding.
Not needed-----	Medium to low available water capacity.	Moderate intake rate.	Gentle slopes; moderate to moderately slow permeability; moderate erodibility.	High erodibility; medium to low available water capacity; low fertility.	Moderately deep root zone; high erodibility.
Seasonal high water table; surface drainage needed in low areas.	Sandy; rapid intake rate; requires frequent applications of water.	Rapid permeability---	Generally not needed.	Soil properties favorable; generally not needed.	Soil properties favorable.
Seasonal high water table; subject to flooding.	Seasonal high water table; subject to flooding.	Moderately slow permeability; good strength and stability; subject to flooding.	Level; not cultivated; subject to flooding.	Level; not cultivated; subject to flooding.	Level; not cultivated; subject to flooding.
Drainage not needed----	Medium available water capacity; moderate intake rate.	Moderate permeability in subsoil; moderately slow seepage; good strength and stability.	Soil properties favorable.	Soil properties favorable.	Soil properties favorable.
Seasonal high water table; surface drainage needed.	High available water capacity.	Moderate permeability; good stability.	Not needed-----	Soil properties favorable.	Soil properties favorable.
Not needed-----	Very rapid intake rate.	Very rapid permeability; poor strength and stability.	Not needed-----	Subject to gully-ing.	Generally not needed; not cultivated.
Not needed-----	Rapid intake rate; low available water capacity.	Rapid permeability; low water impoundment capacity.	Rapid permeability; low strength and stability.	Rapid intake rate; little or no runoff.	Soil properties favorable; generally not needed.
Seasonal high water table; surface drainage needed.	Rapid intake rate..	Rapid permeability in uppermost 20 to 40 inches, moderate below depth of 40 inches.	Generally not needed.	Generally not needed.	Soil properties favorable.
High water table; slow permeability; subject to flooding.	Not cultivated; subject to flooding.	Not cultivated; subject to flooding.	Not needed; level; not cultivated; subject to flooding.	Not needed; not cultivated; subject to flooding.	Not needed; level; not cultivated; subject to flooding.
Seasonal high water table within 15 inches of surface.	Rapid intake rate; seasonal high water table; rapid permeability.	Poor strength and stability; rapid permeability.	Generally not needed.	Generally not needed.	Generally not needed; soil properties favorable.
Wet; not cultivated---	Wet; not cultivated.	Rapid permeability; unstable slopes.	Not needed; level---	Wet; level; not cultivated.	Level; not cultivated.
Seasonal high water table; surface drainage needed.	Wet; generally not cultivated.	Rapid permeability to depth of 36 inches; poor strength and stability.	Wet; generally not cultivated.	Wet; generally not cultivated.	Wet; generally not cultivated.

TABLE 5.—*Interpretation of*

Soil series and map symbols	Suitability as source of—			Soil features affecting—		
	Topsoil	Sand	Road fill	Highway location	Farm ponds	
					Reservoir area	Embankment
Portsmouth (Por).....	Good...	Poor.....	Fair.....	Seasonal high water table; wet, plastic subsoil.	Moderately slow permeability; some seepage in underlying layers.	Moderately slow permeability; fair to good strength and stability.
Robertsdale (RIA).....	Fair....	Poor.....	Fair to poor..	Seasonal high water table; moderate permeability.	Moderate permeability; slow seepage.	Moderate permeability.
Rutlege (RkA).....	Poor....	Poor.....	Fair.....	Seasonal high water table; poor strength and stability.	Rapid permeability; excessive seepage.	Rapid permeability; poor strength and stability.
Stilson (SeA).....	Fair....	Fair.....	Fair to good..	Good stability; moderate shrink-swell potential.	Moderate permeability; slow seepage.	Moderate permeability; moderate shrink-swell potential.
Swamp (Swa).....	Fair....	Poor.....	Poor.....	Subject to frequent flooding.	Subject to frequent flooding.	Material variable; not generally used.
Tifton (TqA, TqB).....	Good....	Poor to fair..	Good.....	Soil properties favorable; good strength and stability.	Moderate permeability; slow seepage.	Moderate permeability; good strength and stability.

Limitations are evaluated for campsites and intensive play areas and for picnic areas. Campsites have to be suitable, with little preparation, for tents and for outdoor living for periods of at least 1 week. Suitability for septic tank systems is not a requirement. Intensive play areas include playgrounds and facilities for organized games, such as baseball, tennis, and basketball. Such areas are subject to much foot traffic and generally require a firm, nearly level surface and good drainage. Picnic areas must be suitable for outings at which a meal is eaten outdoors. Properties to be evaluated include trafficability, inherent erodibility, and slope.

Structures for light industries include buildings that are used for stores, offices, and small industries and that are no more than three stories high. It is assumed that sewage-disposal facilities are available. The properties important in evaluating the soils for this use are slope, depth to the water table, hazard of flooding, shrink-swell behavior, and corrosion potential.

Formation and Classification of Soils

This section discusses briefly the effect of the five major factors of soil formation on the soils of Pierce County and explains the system of classifying soils.

The soil series in the county, including a profile representative of each series, are described in the section "Descriptions of the Soils."

Factors of Soil Formation

Soil is produced by the action of soil-forming processes on parent material. The characteristics of a soil at any

given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material accumulated; (3) the relief, or lay of the land; (4) the plant and animal life on and in the soil; and (5) the length of time these processes have been active.

The relative importance of each factor differs from place to place. In some places one factor may dominate in the formation of a soil and determine most of its properties, as is common where the parent material consists of pure quartz sand. Quartz sand is highly resistant to weathering, and soils formed in it generally have faint horizons. Even in quartz sand, however, a distinct profile can be formed under certain types of vegetation if the relief is low and flat and if the water table is high. The five factors of soil formation are discussed in the following paragraphs.

Parent material

Parent material is the unconsolidated mass from which soil forms. It is largely responsible for the chemical and mineralogical composition of a soil. Most of the soils in Pierce County formed from sedimentary material, which is unconsolidated rock material deposited by water. The material varies in texture from coarse sand to clay.

According to the Geologic Map of Georgia (3), Pierce County consists of three marine terrace formations—the Penholoway, the Hawthorn, and the Sunderland. The depth to the Penholoway and Sunderland formations varies and in places is as much as 120 feet. Both formations consist chiefly of gray to dark-green silty clay and some fine-grained to coarse-grained sand and gravel. The Hawthorn formation occurs at depths of 50 to 320 feet. It consists of pale-green to dark-green phosphatic sandy clay, sand, and sandy limestone.

engineering properties—Continued

Soil features affecting—Continued					
Agricultural drainage	Irrigation	Excavated pits for irrigation	Terraces and diversions	Waterways	Land leveling
Seasonal high water table; surface drainage needed; outlets difficult to locate.	Wet; level; not needed.	Moderately slow permeability; fair to good strength and stability.	Wet; level-----	Wet; level-----	Wet; level.
Seasonal high water table; surface drainage needed.	Moderate intake rate; moderate permeability.	Moderate permeability in underlying layers; fair strength and stability.	Soil properties favorable.	Soil properties favorable.	Soil properties favorable.
Seasonal high water table; surface drainage needed; outlets difficult to locate.	Wet; generally not cultivated.	Rapid permeability; poor strength and stability.	Wet; level-----	Wet; level-----	Wet; level.
Seasonal high water table; surface drainage needed.	Medium available water capacity; high intake rate.	Moderate permeability; good stability.	Soil properties favorable.	Soil properties favorable.	Soil properties favorable.
Wet; subject to frequent flooding.	Wet; subject to frequent flooding.	Wet; subject to frequent flooding.	Wet; subject to frequent flooding.	Wet; subject to frequent flooding.	Wet; subject to frequent flooding.
Drainage not needed...	Medium available water capacity; moderate intake rate.	Moderate permeability; good strength and stability.	Soil properties favorable.	Soil properties favorable.	Soil properties favorable.

The Penholoway formation of the Pleistocene epoch underlies about a third of the county, or the eastern part. The Pelham, Rutlege, Mascotte, and Albany soils formed in material weathered from this formation.

The Hawthorn formation of the Miocene epoch makes up about a third of the county. The Tifton, Fuquay, and Carnegie soils formed in material from this formation.

The Sunderland formation of the Pleistocene epoch underlies the central and southwestern parts of the county. The major soils on this formation are the Lakeland, Chipley, and Kershaw.

Alluvial material consisting of sand, silt, and clay has been deposited on the flood plains of all the major streams. Soils that formed in this material show little evidence of soil development because flooding frequently deposits new material.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of rocks and on the decomposition of minerals and organic matter. It also affects biological activity in the soils and the leaching and movement of weathered materials (8).

In Pierce County the winters are mild, and there is little freezing and thawing of the soil material. The warm climate and moist soils promote rapid chemical and biological action. The large amount of rainfall causes the soils to be highly leached and low in organic-matter content. Because of the leaching of such basic elements as calcium, magnesium, and sodium and their replacement by hydrogen, the soils tend to be acid. The translocation of soluble material as bases and of less soluble material as colloidal matter has resulted in the soils being less fertile than when they were first formed.

Relief

Relief influences soil formation through its effect on drainage, erosion, soil temperature, and plant cover. Although most soils in Pierce County are level or nearly level, soil formation has been affected by three general kinds of relief—low flats, broad ridges, and undulating ridges.

The low flats are broken by swampy or ponded areas and by sluggish drainageways. The water table is high. Most of the soils that formed in these areas are poorly drained or very poorly drained and are gray and distinctly mottled.

The broad ridges are broken by small, rounded ponds and by many small streams. The streams have cut below the general level of the plain and have formed moderately steep side slopes. The water table is at a depth of several feet. The soils in these areas are moderately well drained or well drained and are yellow to yellowish brown.

The undulating ridges are dissected by streams. On these ridges the soils are deep and sandy, and the water table is at a depth of more than 6 feet.

Living organisms

The kind and number of plants and animals that live on and in the soil are determined largely by the climate and, to varying degrees, by the parent material, relief, and time. Bacteria, fungi, and other micro-organisms aid in weathering rock and in decomposing organic matter. Earthworms and other small invertebrates slowly but continuously mix the soil and may alter it chemically. Decaying leaves, twigs, roots, and whole plants add much organic matter to the upper part of the soil, where it is acted on by micro-organisms, earthworms, and other forms of life.

TABLE 6.—*Degree and kind of limitation for selected nonfarm uses*

Soil series and map symbols	Foundations for residences	Filter fields for septic tanks	Campsites and intensive play areas	Picnic grounds	Structures for light industries
Albany (AdA, AsA)---	Severe: seasonal high water table.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.
Alluvial land-----	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Carnegie (CoB2, CoC2).	Slight-----	Severe: percolation slower than 75 minutes per inch.	CoB2: slight; numerous pebbles on surface. CoC2: moderate; 5 to 8 percent slopes.	Slight-----	CoB2: moderate; moderate shrink-swell potential. CoC2: moderate; 5 to 8 percent slopes; moderate shrink-swell potential.
Chipleigh (CmA)-----	Moderate: seasonal high water table.	Moderate to severe: water table below depth of 60 inches for less than 9 months each year.	Moderate: fair trafficability. ¹	Moderate: fair trafficability.	Moderate: seasonal high water table.
Dunbar (DmA)-----	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Fuquay (FsA)-----	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
Irrington (IjA)-----	Slight: seasonal high water table.	Severe: percolation slower than 75 minutes per inch.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: moderate shrink-swell potential.
Kershaw (KkB)-----	Severe: very low available water capacity; sandy.	Severe: poor filtering action; nearby water supplies may be contaminated.	Severe: sandy; poor trafficability.	Severe: sandy; poor trafficability.	Severe: sandy; very low available water capacity.
Lakeland (LpB)-----	Slight: low available water capacity; sandy.	Moderate: poor filtering action; nearby water supplies may be contaminated.	Moderate: sandy; fair trafficability.	Moderate: fair trafficability; sandy.	Slight: sandy; low available water capacity.
Leefield (LiA)-----	Moderate: seasonal high water table.	Severe: water table below depth of 60 inches for less than 9 months each year.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: seasonal high water table.
Lumbee (Lum)-----	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.
Mascotte (MnA)-----	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.
Osier (Osa)----- For Alluvial land part of Osa, see Alluvial land.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Pelham (PaA)-----	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.
Portsmouth (Por)-----	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.	Severe: high water table; flooding.
Robertsdale (RIA)-----	Moderate: seasonal high water table.	Severe: seasonal high water table; percolation slower than 75 minutes per inch.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: seasonal high water table; moderate shrink-swell potential.
Rutledge (RkA)-----	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.

TABLE 6.—*Degree and kind of limitation for selected nonfarm uses—Continued*

Soil series and map symbols	Foundations for residences	Filter fields for septic tanks	Campsites and intensive play areas	Picnic grounds	Structures for light industries
Stilson (SeA)-----	Slight: seasonal high water table.	Severe: percolation slower than 75 minutes per inch.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: moderate shrink-swell potential.
Swamp (Swa)-----	Severe: water table at or near the surface most of the year.	Severe: water table at or near the surface most of the year.	Severe: water table at or near the surface most of the year.	Severe: water table at or near the surface most of the year.	Severe: water table at or near the surface most of the year.
Tifton (TqA, TqB)---	Slight-----	Moderate: percolation 45 to 75 minutes per inch in lower part of profile.	Slight: numerous pebbles on surface.	Slight-----	Moderate: moderate shrink-swell potential.

¹ The ease with which people can move over the soil on foot, on horseback, or in small vehicles such as golf carts.

The soils of Pierce County formed under forest. Mixed stands of pines and hardwoods once covered the uplands. Gum and cypress grew on the flood plains. The undergrowth was chiefly bay, maple, swamp holly, titi, wax-myrtle, saw-palmetto, and gallberry. These larger plants transfer elements from the subsoil to the surface soil by assimilating those elements into their tissues and then depositing this tissue on the surface as fallen fruit, leaves, or stems.

Man has helped to change the direction and rate of development of soils by clearing the forests, cultivating the soils, and introducing new kinds of plants. Except for a sharp reduction in the content of organic matter in the soils after a few months of cultivation, few results of these changes can be seen as yet. Some results probably will not be evident for many centuries. Nevertheless, the complex of living organisms affecting soil formation in Pierce County has been drastically changed as a result of man's activity.

Time

The length of time required for a mature soil to form depends largely on the other factors of soil formation. Less time is generally required for a soil to develop in a humid, warm climate than in a dry, cold climate because moisture and a warm temperature accelerate chemical and biological activity. Also, less time is required for a soil to develop in moderately permeable soil material than in slowly permeable soil material. Given sufficient time, however, the parent material is modified so that genetic horizons of an A, B, C sequence are formed.

The age of the soils in Pierce County varies considerably. Generally, the older soils show a greater degree of horizon differentiation than the younger ones. For example, on the level to very gently sloping uplands in the central part of the county, the soils have stronger profile development than those in the eastern part where the soil material has been in place too short a time to allow a mature profile to form.

Classification of Soils

Soils are placed in narrow classes for the organization and application of knowledge about their behavior within

farms, ranches, or counties. They are placed in broad classes for study and comparison of large areas, such as continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (6) and later revised. The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965 and supplemented in March 1967. This system is under continual study. Therefore, readers interested in the development of the system should search for the latest literature available (4, 9).

The current system defines classes in terms of observable or measurable properties of soils. The properties chosen are primarily those that permit grouping soils that are similar in genesis. The classification is designed to encompass all soils. Its nomenclature is both connotative and distinctive.

The current classification has six categories. Beginning with the most inclusive, they are the order, suborder, great group, subgroup, family, and series. They are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, Entisols and Histosols, occur in many different climates. Four soil orders are represented in Pierce County—Entisols, Inceptisols, Spodosols, and Ultisols.

Entisols are young mineral soils that do not have genetic horizons or have only the beginning of such horizons.

Inceptisols are mineral soils in which horizons have started to develop. They generally are on young, but not recent, land surfaces.

Spodosols are mineral soils that have a spodic horizon.

Ultisols are mineral soils that have distinct horizons and are commonly on old land surfaces. They contain a clay-enriched B horizon that has low base saturation. The base saturation decreases with increasing depth.

SUBORDER.—Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders have a narrower climatic range than the orders. The criteria for suborders chiefly reflect the pres-

ence or absence of waterlogging or soil differences resulting from climate or vegetation. The suborders represented in Pierce County are Psamments, Aquepts, Aquods, Aquults, and Udults.

GREAT GROUPS.—Each suborder is separated into great groups according to the presence or absence of genetic soil horizons and the arrangement of these horizons. The great groups represented in Pierce County are Quartzipsamments, Humaquepts, Haplaquods, Ochraqults, Umbraquults, Paleudults, and Fragiudults.

SUBGROUPS.—Each great group is divided into subgroups. One of these subgroups represents the central (typic) segment of the great group, and the others, called intergrades, contain those soils having properties mostly of one great group but also having one or more properties of soils in another great group, suborder, or order.

FAMILIES.—Each subgroup is divided into families, primarily on the basis of properties important to the growth of plants. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

SERIES.—The series is a narrower category within the family. All the soils of a given series formed from a particular kind of parent material and have genetic horizons that, except for the texture of the surface layer, are similar in differentiating characteristics and in arrangement in the soil profile. Among the differentiating characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition.

New soil series must be established and concepts of some established series, especially the older ones, must be revised in the course of the nationwide soil survey program. A proposed new series has tentative status until review of the series concept at State, regional, and national levels of responsibility for soil classification results in a judgment that the new series should be established. Five of the soil series in this survey had tentative status when the survey was sent to the printer. They are the Albany, Chipley, Leefield, Osier, and Stilson series.

In table 7 the soil series in Pierce County are classified according to the current system of soil classification.

General Nature of the County

This section discusses briefly the organization, settlement, and population of the county and gives some facts about farming, industries, and transportation. It also describes the physiography and drainage of the county and gives some information concerning the water supply and climate.

Organization, settlement, and population

Pierce County was created by an act of legislature on December 18, 1857. It was formed from areas taken from Wayne, Appling, and Ware Counties and was named for General Franklin Pierce of New Hampshire, who later became the fourteenth president of the United States. In 1914 and again in 1920, areas of Pierce County were taken to form parts of other counties. In 1920, Pierce County was left with its present area of 218,800 acres.

The first settlers in this region came mainly from other sections of Georgia and from South Carolina. Blackshear was established as the county seat and was named for General David Blackshear, a wealthy planter and distinguished leader.

The central and western parts of the county were settled mainly by farmers who cleared small tracts to grow tobacco, cotton, and corn. Poultry, hogs, and beef cattle were produced chiefly for home use. The eastern part of the county remained largely in woodland. The forests were used principally for the production of lumber and turpentine.

From 1910 to 1945, the population of Pierce County increased steadily. Since 1950, it has been gradually decreasing, and in 1960, it was only 9,678, or almost 13 percent less than in 1950.

Farming

For some time, farming in the county consisted mainly of clearing small tracts for corn, sweetpotatoes, sugarcane, and vegetables for home use. Cattle, sheep, and hogs were grazed on the open range. As better management practices were adopted, crop production steadily increased.

TABLE 7.—Classification of soil series according to the Comprehensive System, 7th Approximation

Series	Family	Subgroup	Order
Albany.....	Loamy, siliceous, thermic.....	Aquic Grossarenic Paleudults.....	Ultisols.
Carnegie.....	Fine-loamy, siliceous, thermic.....	Plinthic Paleudults.....	Ultisols.
Chipley.....	Siliceous, acid, thermic, coated.....	Aquic Quartzipsamments.....	Entisols.
Dunbar.....	Clayey, kaolinitic, thermic.....	Aeric Ochraqults.....	Ultisols.
Fuquay.....	Loamy, siliceous, thermic.....	Arenic Plinthic Paleudults.....	Ultisols.
Irvington.....	Fine-loamy, siliceous, thermic.....	Plinthic Ochreptic Fragiudults.....	Ultisols.
Kershaw.....	Siliceous, thermic, uncoated.....	Typic Quartzipsamments.....	Entisols.
Lakeland.....	Siliceous, thermic, coated.....	Typic Quartzipsamments.....	Entisols.
Leefield.....	Loamy, siliceous, thermic.....	Arenic Plinthic Paleudults.....	Ultisols.
Lumbee.....	Fine-loamy, siliceous, thermic.....	Typic Ochraqults.....	Ultisols.
Mascotte.....	Sandy over loamy, siliceous, thermic.....	Ultic Haplaquods.....	Spodosols.
Osier.....	Siliceous, thermic.....	Typic Psammaquents.....	Entisols.
Pelham.....	Loamy, siliceous, thermic.....	Arenic Ochraqults.....	Ultisols.
Portsmouth.....	Fine-loamy, siliceous, thermic.....	Typic Umbraquults.....	Ultisols.
Robertsdale.....	Fine-loamy, siliceous, thermic.....	Plinthaqueptic Fragiudults.....	Ultisols.
Rutlege.....	Sandy, siliceous, acid, thermic.....	Typic Humaquepts.....	Inceptisols.
Stilson.....	Loamy, siliceous, thermic.....	Arenic Plinthic Paleudults.....	Ultisols.
Tifton.....	Fine-loamy, siliceous, thermic.....	Plinthic Paleudults.....	Ultisols.

In recent years, there has been a considerable increase in yields per acre. For example, yields of corn increased from 12.2 bushels in 1939 to 36 bushels in 1960; cotton, from 236 pounds of lint in 1935 to 350 pounds of lint in 1960; and tobacco, from 1,060 pounds in 1940 to 2,171 pounds in 1960.

According to the Census of Agriculture, there were 838 farms in the county in 1959, and they averaged 170.6 acres in size. This is a decrease of about 43 percent in the number of farms since 1935, but there has been a considerable increase in the size of farms. In addition, farming methods have improved to the extent that the acreage of many of the crops commonly grown is smaller, but overall production is greater because of higher yields per acre. Improved methods include rotation of crops, selection of better crop varieties, more effective use of crop residues, and more liberal use of fertilizers. Also, efforts are made to control plant diseases and insects; irrigation is being used more each year; and some less productive soils, formerly used for row crops, are now used for improved pasture or have been planted to pine.

Industries

Many of the industries in the county depend on the forests, which cover about two-thirds of the acreage. Pulpwood and raw gum for turpentine are collected at receiving stations and shipped to cities for the manufacture of finished products. A lumber plant, several portable sawmills, a shoe factory, four feed mills, a fertilizer-blending plant, and several cotton gins operate in the county. Many workers commute to jobs in adjacent counties.

Physiography and drainage

Pierce County is within the Atlantic Coast Flatwoods Major Land Resource Area. It consists of three marine terrace formations—the Penholoway, the Hawthorn, and the Sunderland. The elevation ranges from 150 feet at Merston to 58 feet in Zero Bay.

The Satilla and Little Satilla Rivers, which form the southern and eastern boundaries, and Big Satilla Creek, which forms part of the northern boundary, are bordered by a narrow band of terraces. The soils on these terraces formed in alluvium washed from the uplands. They are nearly level and are very poorly drained to moderately well drained.

Except for a few slope breaks, the central part of the county is very gently sloping. The soils are well drained or moderately well drained.

The rest of the county is nearly level and consists of somewhat poorly drained, poorly drained, and very poorly drained soils.

The county is drained chiefly by the Satilla and Little Satilla Rivers. Little Hurricane Creek and Hurricane Creek join to form the Alabaha River, which flows into the Satilla River. Big Satilla Creek drains into and forms the Little Satilla River. Between these major streams are moderately well developed intermittent streams.

The drainage provided by small branches and creeks is sluggish. Generally, there is no definite channel in the upper reaches of these streams, but the channel farther downstream is better defined. The channels of the larger streams tend to meander over the lowlands. Many of the larger streams overflow their banks during periods of heavy rainfall.

The bottom lands along the branches and creeks are too wet for cultivation. Most areas are subject to floods of brief to fairly long duration and, therefore, have been left in forest. Some of this land could be used for pasture if drainage were provided.

Water supply

Water for municipal, industrial, and farm needs is supplied by wells. On most farms the wells are between 30 and 70 feet in depth. In recent years several deep wells have been drilled to supply water for irrigation and livestock. Although there are many streams in the county, most of the smaller streams contain flowing water only during wet periods.

Ponds have been built on a number of the smaller streams, and there are many other sites suitable for ponds. These small ponds provide water for livestock, fishing, or irrigation and serve as reservoir areas to reduce the hazard of flooding. Numerous irrigation pits have also been constructed throughout the county.

Climate⁵

The location of Pierce County on the lower coastal plain of Georgia, less than 40 miles from the Atlantic Ocean, results in a predominantly maritime type of climate. Summers are long, warm, and humid; winters are generally mild. Table 8 gives approximate temperature and precipitation data by months, based partly on records from nearby counties. Tables 9 and 10 give additional precipitation data.

Extremely high temperatures are rare in the county and never persist for extended periods. Temperatures of 90° F. or higher can be expected on about 3 out of 4 days from June through August. Temperatures above 100° occur in only about half the years. The temperature drops steadily after sunset and by early morning usually reaches the low seventies or high sixties. Only July and August have an average minimum temperature as high as 70°.

Freezing temperatures occur every year, but a temperature as low as 20° is likely in only about half the years. Cold spells that drop the temperature to below freezing normally last only 2 or 3 days and ordinarily are followed by several days of comparatively mild temperatures. Daytime temperatures rise to well above freezing, even during the coldest part of the year. On the average, the frost-free period extends from early in March to the middle of November, or a growing season of nearly 260 days. Table 11 gives the probability of freezes of specified intensity occurring after certain dates in spring and before certain dates in fall.

The most pleasant weather generally occurs in spring and fall. As a rule, spring is somewhat cooler and wetter than fall, and there are more frequent changes in weather. Autumn normally is characterized by long periods of mild, sunny weather.

The average annual rainfall of nearly 50 inches is usually adequate for most crops. Normally, almost half the average yearly rainfall occurs from June through September. Nevertheless, dry spells that vary in length occur during most years. Thus, irrigation of higher priced crops is desirable. Table 12 shows the frequency of dry spells. The frequency of heavy rains is also greatest in summer

⁵ By HORACE S. CARTER, State climatologist, U.S. Weather Bureau, University of Georgia, College of Agriculture, Athens, Ga.

and early in fall. More than half the storms that produce 2 inches or more of rain in 24 hours occur from June to September. Although snowfall occurs infrequently, measurable amounts have been recorded.

Prevailing winds generally are from the north in fall and winter and from the south in spring and summer. Average windspeeds range from slightly more than 7 miles an hour in summer to about 9 miles an hour in winter and

spring. Winds during severe thunderstorms are strong enough to cause some local damage, and occasionally in autumn, tropical cyclones bring in winds of gale force.

The average relative humidity is fairly high in Pierce County. Averages for early morning range from about 85 percent in spring to nearly 90 percent in autumn. Averages for early afternoon range from the low fifties in spring to about 60 percent in midsummer and early in autumn.

TABLE 8.—*Temperature and precipitation data*

[Based partly on records from nearby counties]

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
	^{° F.}	^{° F.}	^{° F.}	^{° F.}	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
January.....	66.0	40.5	81	24	3.08	0.8	5.4
February.....	68.0	42.6	82	27	3.45	1.1	6.5
March.....	73.6	47.8	86	33	4.21	1.4	8.8
April.....	80.1	54.0	89	40	3.91	1.2	6.9
May.....	87.5	61.4	95	50	3.51	1.1	7.2
June.....	92.0	68.1	99	61	4.86	1.9	7.9
July.....	92.4	70.2	99	65	7.45	3.5	11.1
August.....	92.7	70.2	99	65	5.70	1.8	10.6
September.....	88.2	66.6	96	58	5.51	2.5	9.1
October.....	81.3	55.8	90	41	2.97	.3	7.3
November.....	73.3	46.0	85	29	1.98	.6	4.5
December.....	66.0	40.2	80	23	3.04	.7	5.8
Year.....	80.1	55.3	¹ 101	¹ 20	49.67	37.2	61.9

¹ The extreme temperature that will be equalled or exceeded on at least 4 days in 2 years out of 10 years.

TABLE 9.—*Average number of days per year (by month) with rainfall equal to or greater than stated amounts*

[Based partly on records from nearby counties. Records for a 10-year period, 1955 through 1964]

Rainfall equal to or greater than—	Average number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
0.10 inch.....	7	7	7	5	6	8	11	8	7	4	3	4	77
0.25 inch.....	4	5	5	5	5	5	7	5	5	3	2	2	53
0.50 inch.....	3	2	2	3	3	4	4	4	3			1	32

TABLE 10.—*Total number of days in 10 years (by month) with rainfall equal to or greater than stated amounts*

Rainfall equal to or greater than—	Total number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10-year period
1 inch.....	15	10	10	11	11	13	20	15	15	9	4	8	141
2 inches.....	1	1	2	4	4	2	8	3	7	5	0	2	39
3 inches.....	0	0	1	2	1	0	1	1	2	0	0	0	8
4 inches.....	0	0	1	1	0	0	1	1	0	0	0	0	4

TABLE 11.—*Probabilities of last freezing temperature in spring and first freezing temperature in fall*

Probability	Dates for given probability and temperature of—		
	24° F. or lower	28° F. or lower	32° F. or lower
Spring:			
1 year in 10 later than-----	March 2	March 12	March 30
2 years in 10 later than-----	February 18	March 5	March 20
5 years in 10 later than-----	January 22	February 18	March 5
Fall			
1 year in 10 earlier than-----	November 25	November 12	November 1
2 years in 10 earlier than-----	November 29	November 18	November 8
5 years in 10 earlier than-----	December 15	November 28	November 14

TABLE 12.—*Number of 2-, 4-, and 6-week periods in 10 years (by months) with no day having 0.25 inch or more of precipitation*

[Periods listed in the month during which the greater part occurred]

Periods equal to or greater than—	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10-year period
2 weeks-----	6	5	5	6	4	5	0	6	6	9	7	10	69
4 weeks-----	2	1	2	1	0	1	0	0	0	3	5	2	17
6 weeks-----	1	0	1	0	0	0	0	0	0	1	1	1	5

Literature Cited

- (1) ABERCROMBIE, W. F.
1954. A SYSTEM OF SOIL CLASSIFICATION. Highway Res. Bd. Proc. Pub. 324, pp. 509-514, illus.
- (2) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS.
1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., illus.
- (3) GEORGIA DIVISION OF MINES, MINING AND GEOLOGY.
1939. GEOLOGIC MAP OF GEORGIA. Prepared by Ga. Div. of Mines, Mining and Geol., in cooperation with the U.S. Dept. of Int., Geol. Survey, 1 p.
- (4) SIMONSON, ROY W.
1962. SOIL CLASSIFICATION IN THE UNITED STATES. Sci. 137: 1027-1034.
- (5) UNITED STATES DEPARTMENT OF AGRICULTURE.
1929. VOLUME, YIELD, AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES. Misc. Pub. No. 50, 202 pp., illus. (Out of print.)
- (6) _____
1938. SOILS AND MEN. U.S. Dept. Agr. Ybk., pp. 979-1001, illus.
- (7) _____
1951. SOIL SURVEY MANUAL. U.S. Dept. Agr. Handbook No. 18, 503 pp., illus.
- (8) _____
1957. SOIL. U.S. Dept. Agr. Ybk., pp. 17-31, illus.
- (9) _____
1960. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. Soil Survey Staff, Soil Conservation Service, 265 pp., illus. (Supplement issued March 1967.)
- (10) U.S. FOREST SERVICE.
1960. MANAGEMENT AND INVENTORY OF SOUTHERN HARDWOODS. Agr. Handbook No. 181.
- (11) WATERWAYS EXPERIMENT STATION.
1953. THE UNIFIED SOIL CLASSIFICATION SYSTEM. Tech Memo. 3-357, v. 1.

Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The capacity of a soil to hold water in a form available to plants. Amount of moisture held in soil between field capacity, or about one-third atmosphere of tension, and the wilting coefficient, or about 15 atmospheres of tension.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material may be sandy or clayey, and it may be cemented by iron oxide, silica, calcium carbonate, or other substances.

Horizon soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major soil horizons:

O horizon. A layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon. The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and it is therefore marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has (1) distinctive characteristics caused by accumulation of clay, sesquioxides, humus, or some combination of these; (2) prismatic or blocky structure; (3) redder or stronger colors than the A horizon; or (4) some combination of these. The combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon. The weathered rock material immediately beneath the solum. This layer, commonly called the soil parent material, is presumed to be like that from which the overlying horizons were formed in most soils. If the underlying material is known to be different from that in the solum, a Roman numeral precedes the letter C.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is the movement of water through soil layers or material.

Leaching. The removal of soluble materials from soils or other soil material by percolating water.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Mulch. A natural or artificially applied layer of plant residue or other material on the surface of the soil. Mulches are generally used to help conserve moisture, control temperature, prevent surface compaction or crusting, reduce runoff and erosion, improve soil structure, or control weeds. Common mulching materials are wood chips, plant residue, sawdust, and compost.

Organic matter. A general term for plant and animal material, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow*, *slow*, *moderately slow*, *moderate*, *moderately rapid*, *rapid*, and *very rapid*.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid.....	Below 4.5
Very strongly acid.....	4.5 to 5.0
Strongly acid.....	5.1 to 5.5
Medium acid.....	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral.....	6.6 to 7.3
Mildly alkaline.....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline.....	8.5 to 9.0
Very strongly alkaline.....	9.1 and higher

Sand. As a soil separate, individual rock or mineral fragments ranging from 0.05 to 2.0 millimeters in diameter. Most sand grains consist of quartz, but sand may be of any mineral composition. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief, over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in a mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stratified. Composed of, or arranged in, strata, or layers, as is stratified alluvium. The term is confined to geological material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips, or bands, to serve as vegetable barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland. Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Weathering. All physical and chemical changes produced in rocks at or near the earth's surface by atmospheric agents. These changes result in more or less complete disintegration and decomposition of the rock.

GUIDE TO MAPPING UNITS

[For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs.]

[See table 1, page 5, for approximate acreage and proportionate extent of the soils. See table 2, page 20, for estimated yields per acre of the principal crops. For facts about the engineering properties of the soils, turn to the section beginning on page 26, and for facts about nonfarm uses of the soils, see the section beginning on page 29]

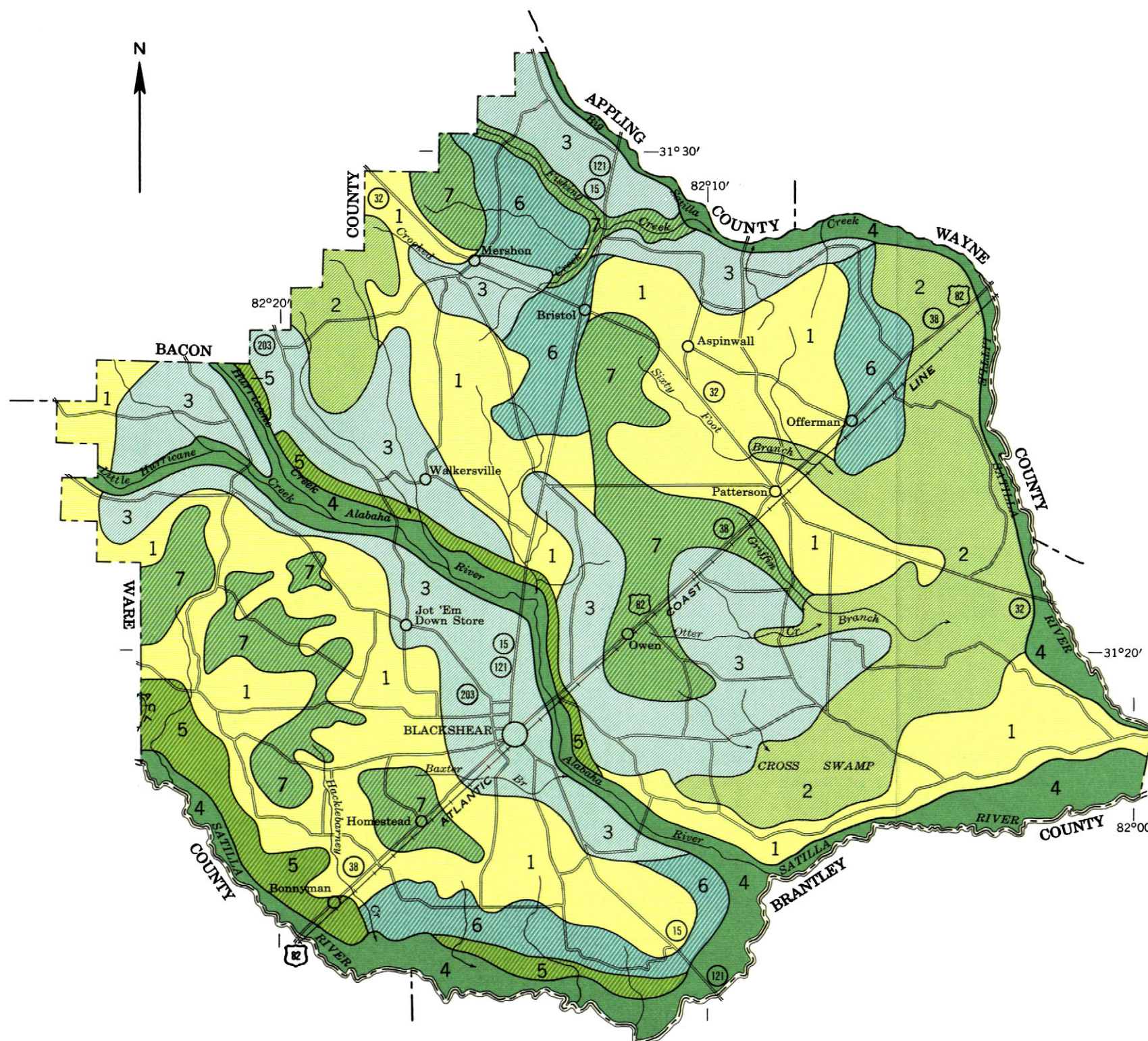
Map symbol	Mapping unit	De- scribed on page	Capability unit ¹	Woodland suitability group		Woodland grazing group		Wildlife suitability group	
				Symbol	Number Page	Number Page	Number Page		
AdA	Albany sand, 0 to 2 percent slopes.....	5	IIIw-1	6	23	6	24	3	25
AsA	Albany loamy fine sand, 0 to 2 percent slopes.....	5	IVw-4	6	23	6	24	3	25
CmA	Chipley sand, 0 to 2 percent slopes.....	7	IIIw-1	6	23	6	24	3	25
CoB2	Carnegie sandy loam, 2 to 5 percent slopes, eroded.....	6	IIIe-4	1	22	1	23	5	26
CoC2	Carnegie sandy loam, 5 to 8 percent slopes, eroded.....	7	IVe-4	1	22	1	23	5	26
DmA	Dunbar fine sandy loam, 0 to 2 percent slopes.....	8	IVw-5	3	22	3	24	4	26
FsA	Fuquay loamy sand, 0 to 2 percent slopes.....	8	IIs-1	1	22	1	23	6	26
IjA	Irvington loamy sand, 0 to 2 percent slopes.....	9	IIw-2	2	22	2	24	4	26
KkB	Kershaw coarse sand, 0 to 5 percent slopes.....	10	VIIIs-1	4	22	4	24	7	26
LiA	Leefield sand, 0 to 2 percent slopes.....	11	IIw-2	6	23	6	24	3	25
LpB	Lakeland sand, 0 to 5 percent slopes.....	10	IVs-1	5	22	5	24	7	26
Lum	Lumbee fine sandy loam.....	11	IVw-4	3	22	3	24	1	25
MnA	Mascotte sand.....	12	Vw-4	6	23	6	24	2	25
Osa	Osier soils and Alluvial land.....	12	Vw-3	3	22	3	24	1	25
PaA	Pelham sand, 0 to 2 percent slopes.....	13	IVw-4	3	22	3	24	1	25
Por	Portsmouth loam.....	14	IIIw-2	3	22	3	24	1	25
RkA	Rutlege sand.....	16	Vw-2	3	22	3	24	1	25
RIA	Robertsdale loamy sand, 0 to 2 percent slopes.....	15	IIw-2	2	22	2	24	4	26
SeA	Stilson loamy sand, 0 to 2 percent slopes.....	16	IIw-2	2	22	2	24	4	26
Swa	Swamp.....	17	VIIw-1					1	25
TqA	Tifton loamy sand, 0 to 2 percent slopes.....	18	I-2	1	22	1	23	6	26
TqB	Tifton loamy sand, 2 to 5 percent slopes.....	18	Ile-2	1	22	1	23	6	26

¹ A discussion of the suitability of the soil for crops and pasture and of the management needed is included in the description of the mapping unit.

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

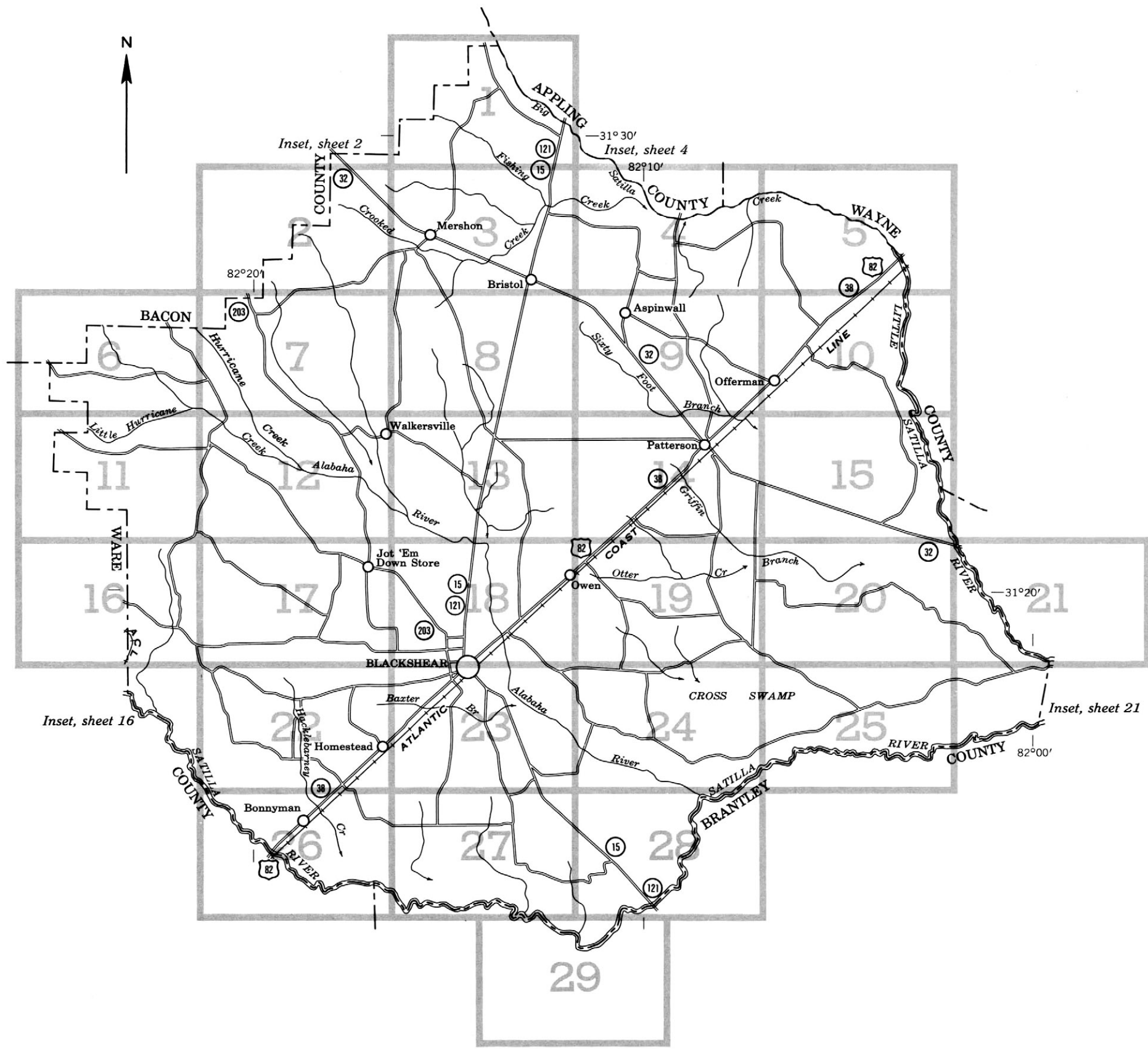
GENERAL SOIL MAP PIERCE COUNTY, GEORGIA



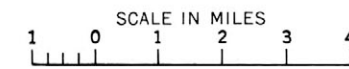
SOIL ASSOCIATIONS

- 1 Leefield-Robertsdale-Pelham association: Somewhat poorly drained and poorly drained soils on low uplands, on broad flats, and in slight depressions
- 2 Pelham-Portsmouth-Mascotte association: Poorly drained and very poorly drained soils on low broad flats, in drainageways and ponded depressions, and on low uplands
- 3 Tifton-Irvington-Robertsdale association: Nearly level to gently sloping, moderately well drained, well drained, and somewhat poorly drained soils on uplands
- 4 Lumbee-Swamp association: Poorly drained soils subject to flooding, and swamps
- 5 Lakeland-Kershaw-Chipley association: Excessively drained sandy soils on upland ridges, and moderately well drained sandy soils on low uplands
- 6 Irvington-Robertsdale-Leefield association: Nearly level to gently sloping, moderately well drained and somewhat poorly drained soils on uplands
- 7 Pelham-Leefield-Albany association: Poorly drained and somewhat poorly drained soils that have a high water table for long periods; on low broad flats, in slight depressions, and on low uplands

September 1967



INDEX TO MAP SHEETS
PIERCE COUNTY, GEORGIA



SOIL LEGEND

The first letter in each symbol is the initial one of the soil name. If the third letter is a capital it shows the range of slope, from A, less than 2 percent, to C, 5 to 8 percent. Symbols without a slope letter are those of nearly level soils or land types. Soils that are named as eroded have a final number, 2, in their symbol.

SYMBOL	NAME
AdA	Albany sand, 0 to 2 percent slopes
AsA	Albany loamy fine sand, 0 to 2 percent slopes
CmA	Chipley sand, 0 to 2 percent slopes
CoB2	Carnegie sandy loam, 2 to 5 percent slopes, eroded
CoC2	Carnegie sandy loam, 5 to 8 percent slopes, eroded
DmA	Dunbar fine sandy loam, 0 to 2 percent slopes
FsA	Fuquay loamy sand, 0 to 2 percent slopes
IjA	Irvington loamy sand, 0 to 2 percent slopes
KkB	Kershaw coarse sand, 0 to 5 percent slopes
LiA	Leefield sand, 0 to 2 percent slopes
LpB	Lakeland sand, 0 to 5 percent slopes
Lum	Lumbree fine sandy loam
MnA	Mascotte sand
Osa	Osier soils and Alluvial land
PaA	Pelham sand, 0 to 2 percent slopes
Por	Portsmouth loam
RkA	Rutlege sand
RIA	Robertsdale loamy sand, 0 to 2 percent slopes
SeA	Stilson loamy sand, 0 to 2 percent slopes
SwA	Swamp
TqA	Tifton loamy sand, 0 to 2 percent slopes
TqB	Tifton loamy sand, 2 to 5 percent slopes

WORKS AND STRUCTURES

Highways and roads	
Dual	
Good motor	
Poor motor	
Trail	
Highway markers	
National Interstate	
U. S.	
State or county	
Railroads	
Single track	
Multiple track	
Abandoned	
Bridges and crossings	
Road	
Trail, foot	
Railroad	
Ferry	
Ford	
Grade	
R. R. over	
R. R. under	
Tunnel	
Buildings	
School	
Church	
Station	
Mines and Quarries	
Forest fire or lookout station	
Pits, gravel or other	
Power line	
Pipeline	
Cemetery	
Dams	
Levee	
Tanks	
Well, oil or gas	

CONVENTIONAL SIGNS

National or state	
County	
Reservation	
Land grant	
Small park, cemetery, airport	

DRAINAGE

Streams, double-line	
Perennial	
Intermittent	
Streams, single-line	
Perennial	
Intermittent	
Crossable with tillage implements	
Not crossable with tillage implements	
Unclassified	
Canals and ditches	
Perennial	
Intermittent	
Lakes and ponds	
Perennial	
Intermittent	
Wells, water	
Spring	
Marsh or swamp	
Wet spot	
Alluvial fan	
Drainage end	

RELIEF

Escarpments	
Bedrock	
Other	
Prominent peak	
Depressions	
Crossable with tillage implements	
Not crossable with tillage implements	
Contains water most of the time	

SOIL SURVEY DATA

Soil boundary and symbol	
Gravel	
Stony, very stony	
Rock outcrops	
Chert fragments	
Clay spot	
Sand spot	
Gumbo or scabby spot	
Made land	
Severely eroded spot	
Blowout, wind erosion	
Gully	

Soil map constructed 1967 by Cartographic Division, Soil Conservation Service, USDA, from 1962 and 1963 aerial photographs. Controlled mosaic based on Georgia plane coordinate system, east zone, transverse Mercator projection, 1927 North American datum.



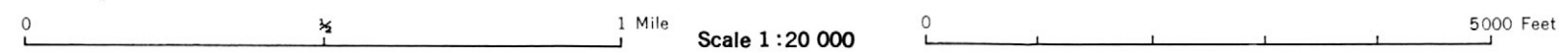
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Georgia College of Agricultural Experiment Stations.

PIERCE COUNTY, GEORGIA NO. 1

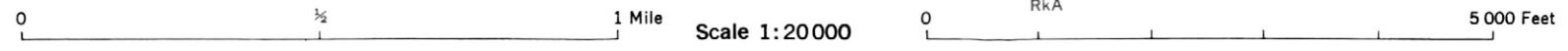
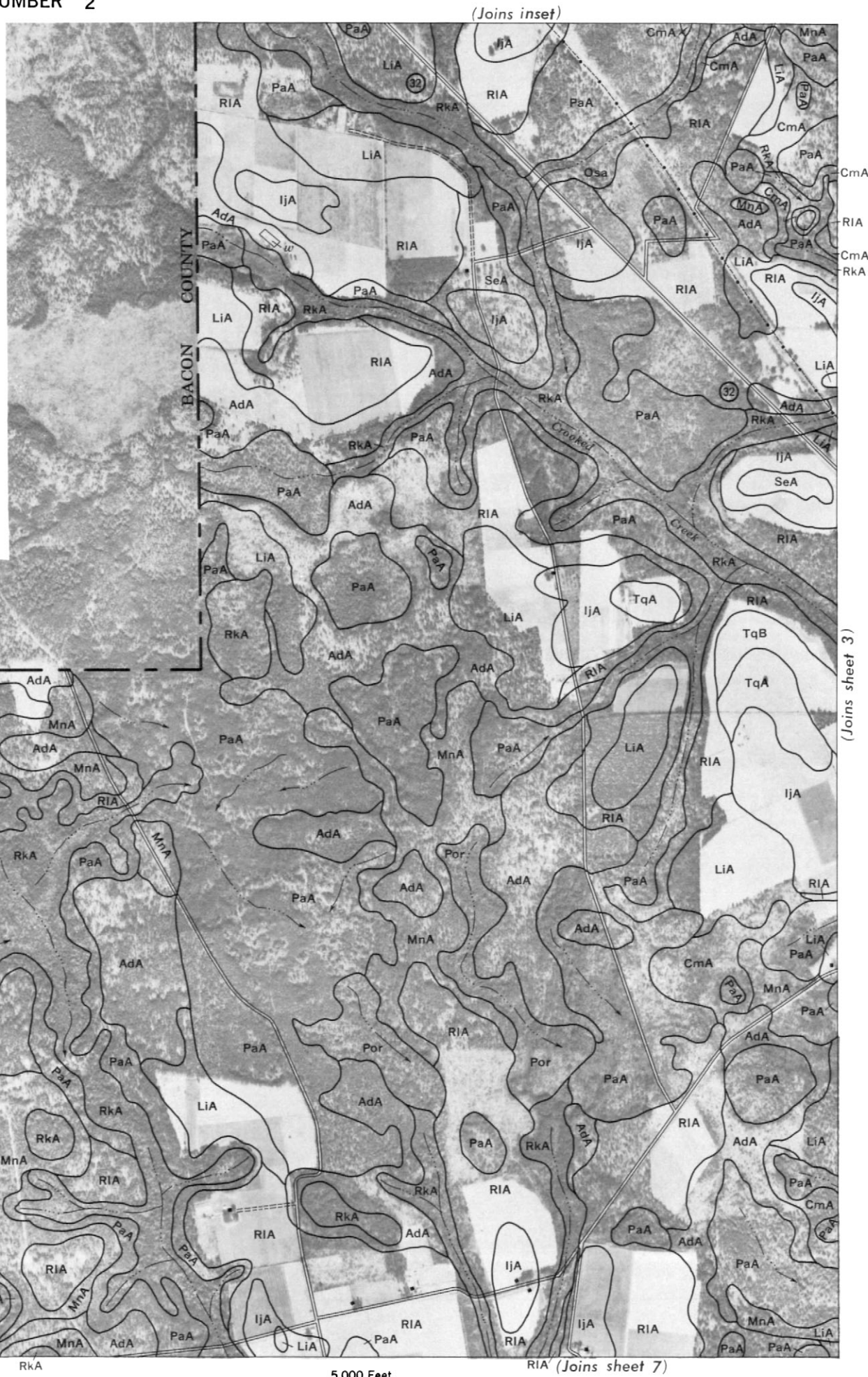
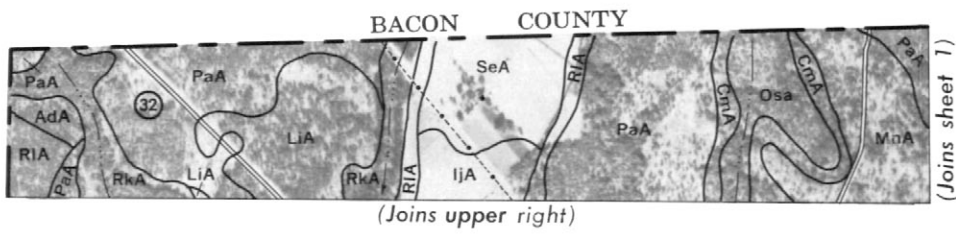


(Joins inset, sheet 2)

(Joins inset, sheet 4)



(Joins sheet 3)

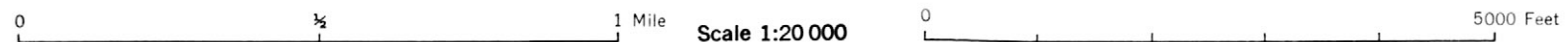




(Joins sheet 2)

(Joins sheet 4)

(Joins sheet 8)



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PIERCE COUNTY, GEORGIA NO. 3





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PIERCE COUNTY, GEORGIA NO. 5



(Joins sheet 10)

0 1/2 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 4)



(Joins sheet 7)

PIERCE COUNTY, GEORGIA NO.6

(Joins sheet 11)

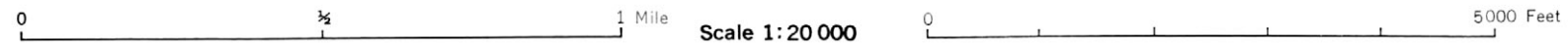
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(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 13)





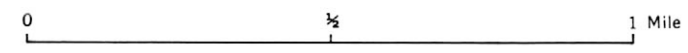
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PIERCE COUNTY, GEORGIA NO. 9

(Joins sheet 8)



(Joins sheet 10)



Scale 1:20000



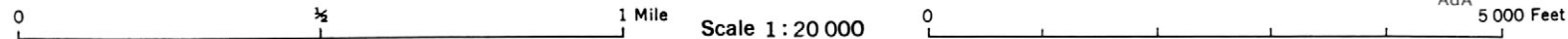
(Joins sheet 14)



(Joins sheet 9)



(Joins sheet 15)



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PIERCE COUNTY, GEORGIA NO. 11

(Joins sheet 6)

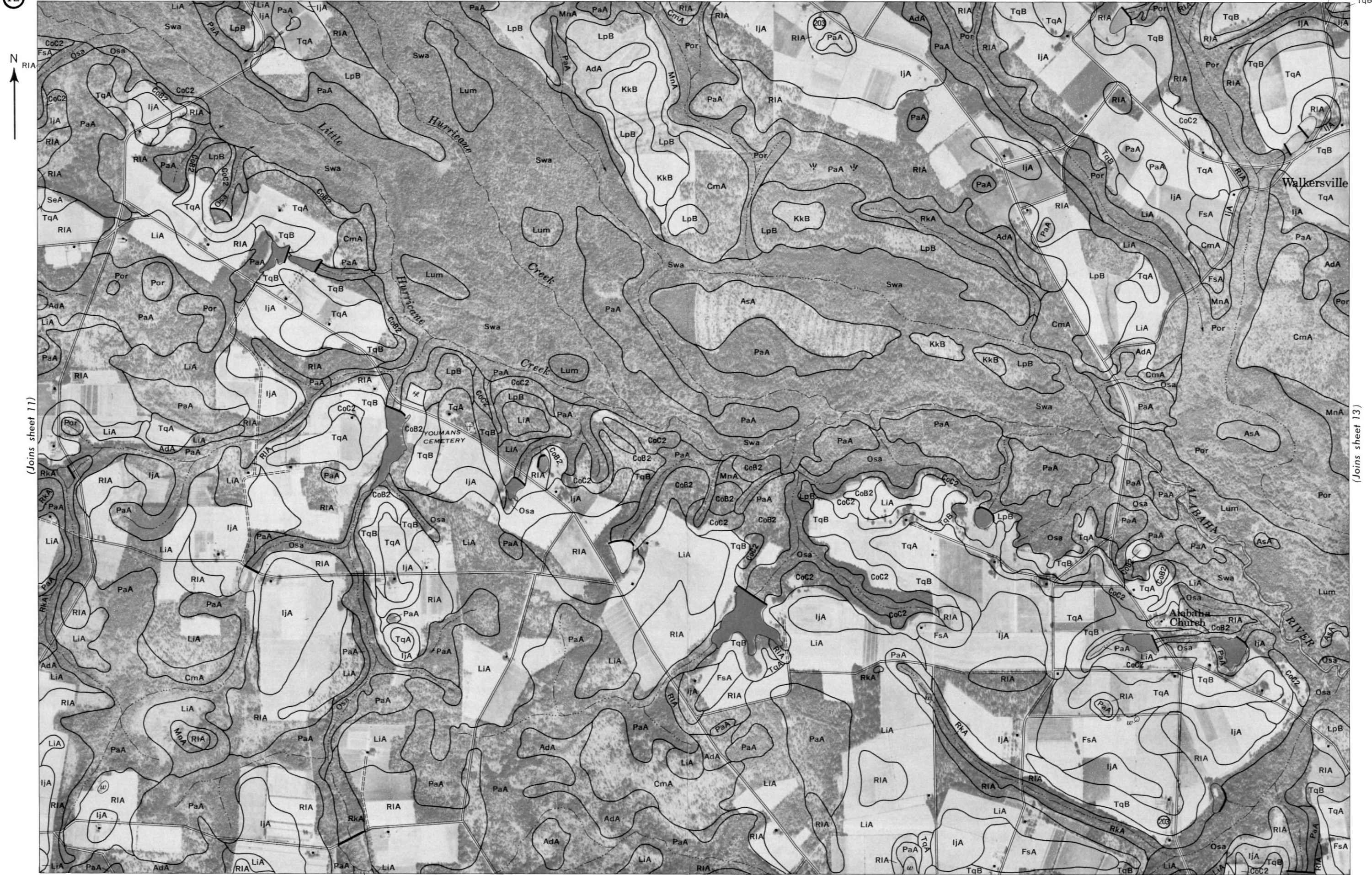


0 1/2 1 Mile Scale 1:20000 0 5000 Feet

(Joins sheet 16)

(Joins sheet 12)

(Joins sheet 7)



(Joins sheet 17)

0 1/2 1 Mile Scale 1:20 000 0 5000 Feet



(Joins sheet 14)



(Joins sheet 12)

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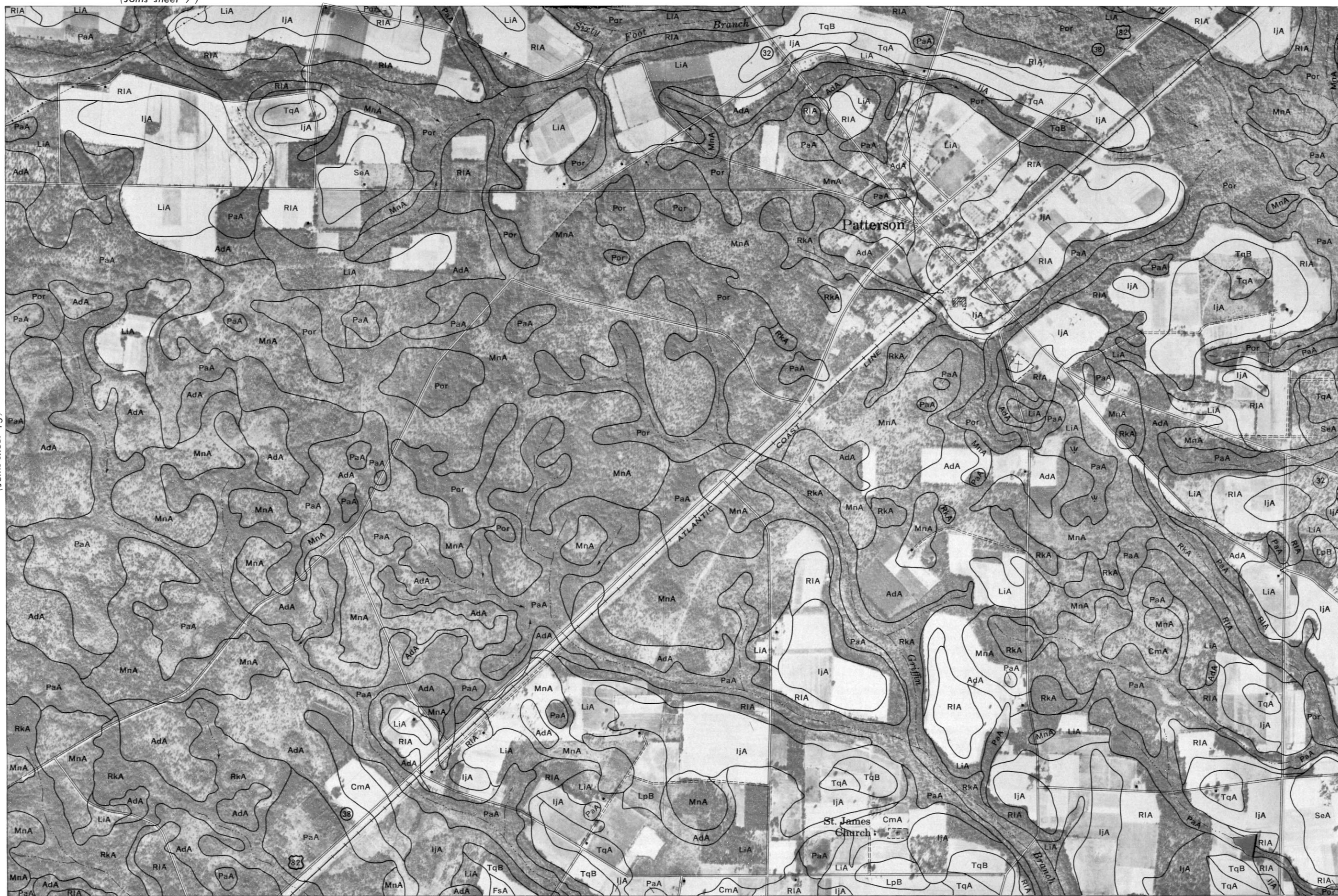
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(Joins sheet 13)

(Join sheet 15)

PIERCE COUNTY, GEORGIA NO.14



(Joins sheet 19)

0

*

1 Mile

Scale 1:20000

9

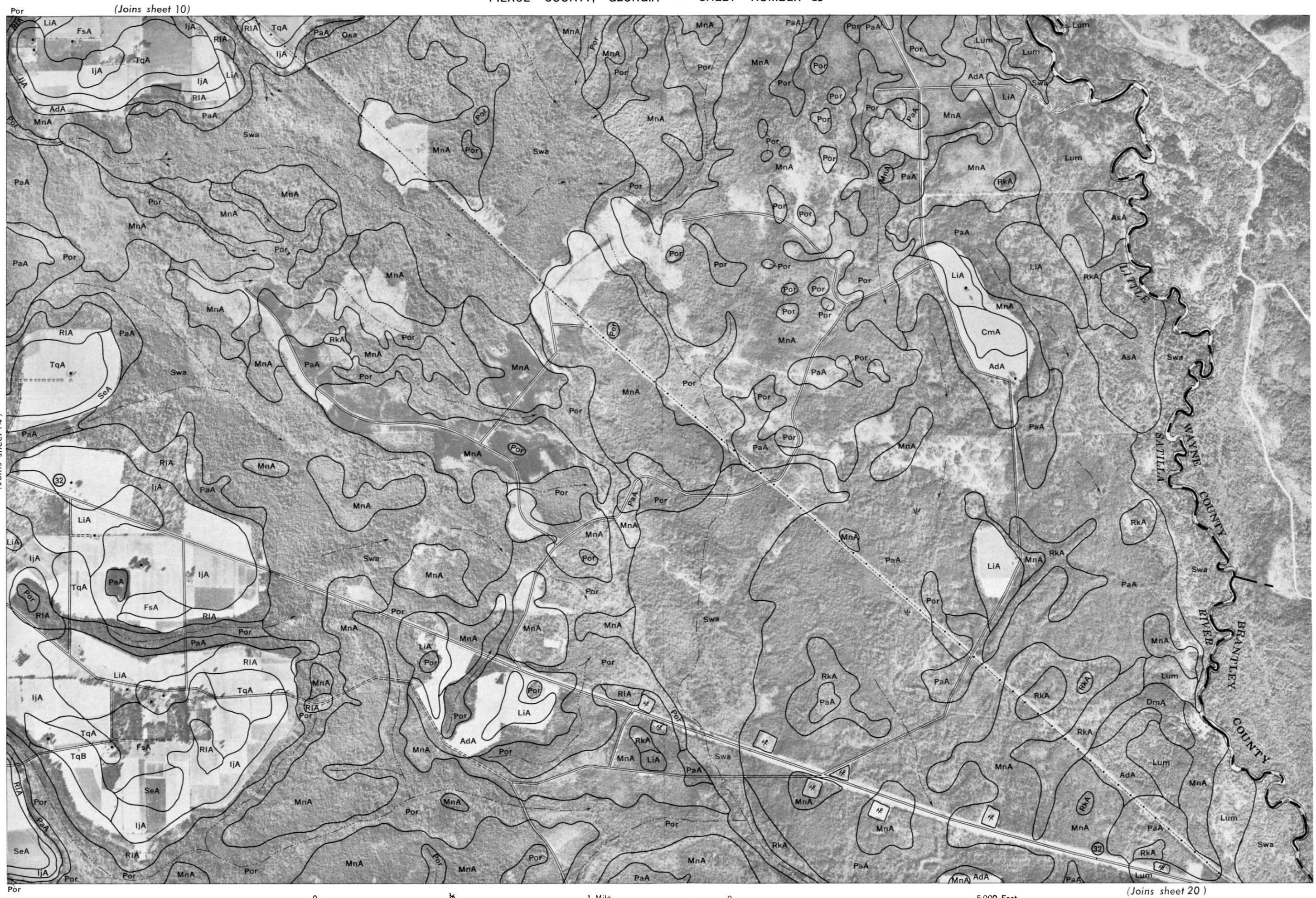
5,000 Feet



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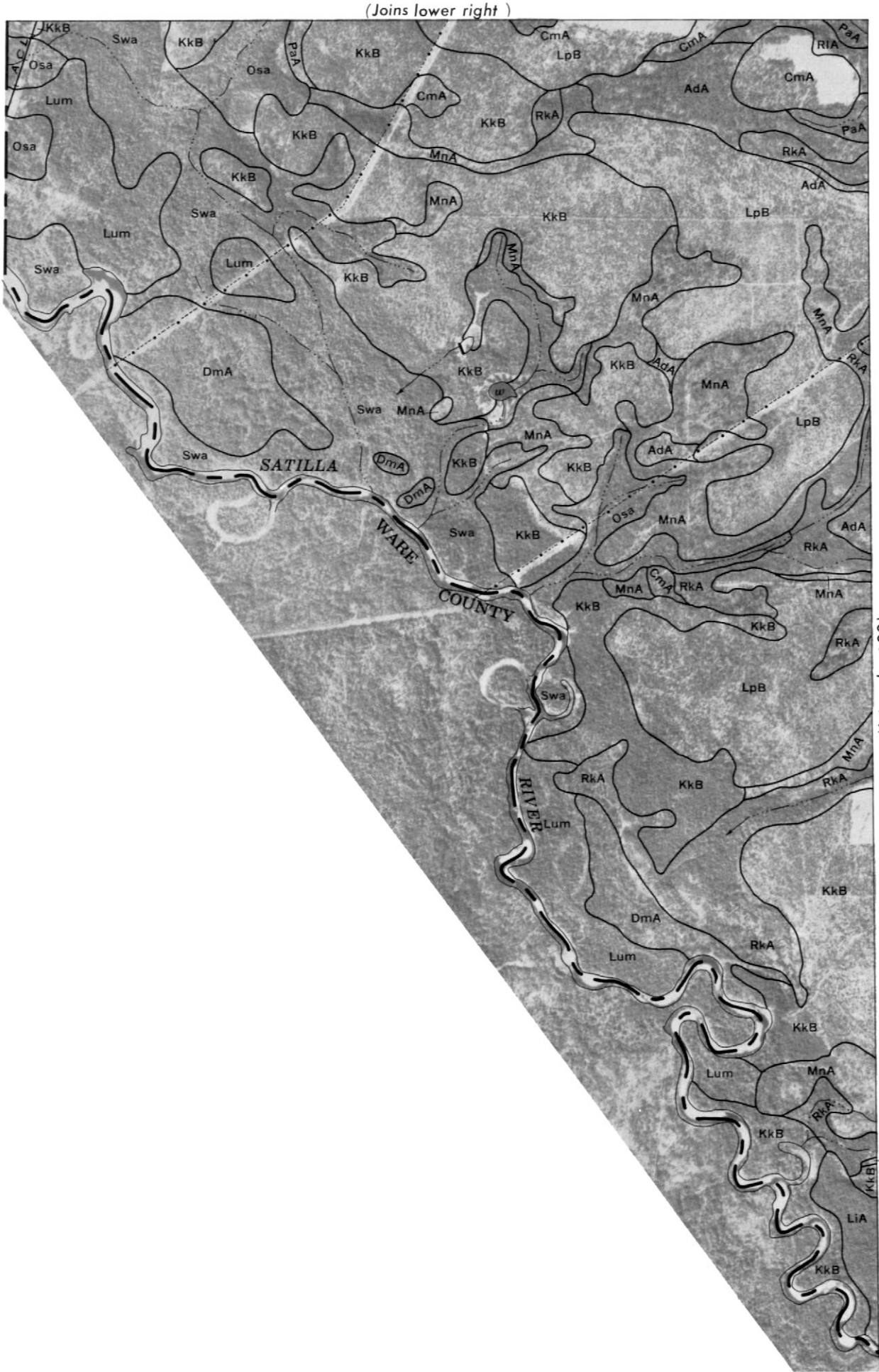
PIERCE COUNTY, GEORGIA NO. 15

(Joins sheet 14)



0 1/2 1 Mile Scale 1:20000 0 5000 Feet

(Joins sheet 20)



(Joins sheet 22)

0 1/2 1 Mile Scale 1:20 000

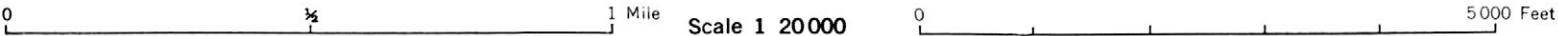
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(Joins sheet 17)

0 5000 Feet (Joins upper left)

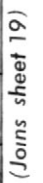
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(Joins sheet 6)

(Joins sheet 18)



PIERCE COUNTY, GEORGIA NO.18



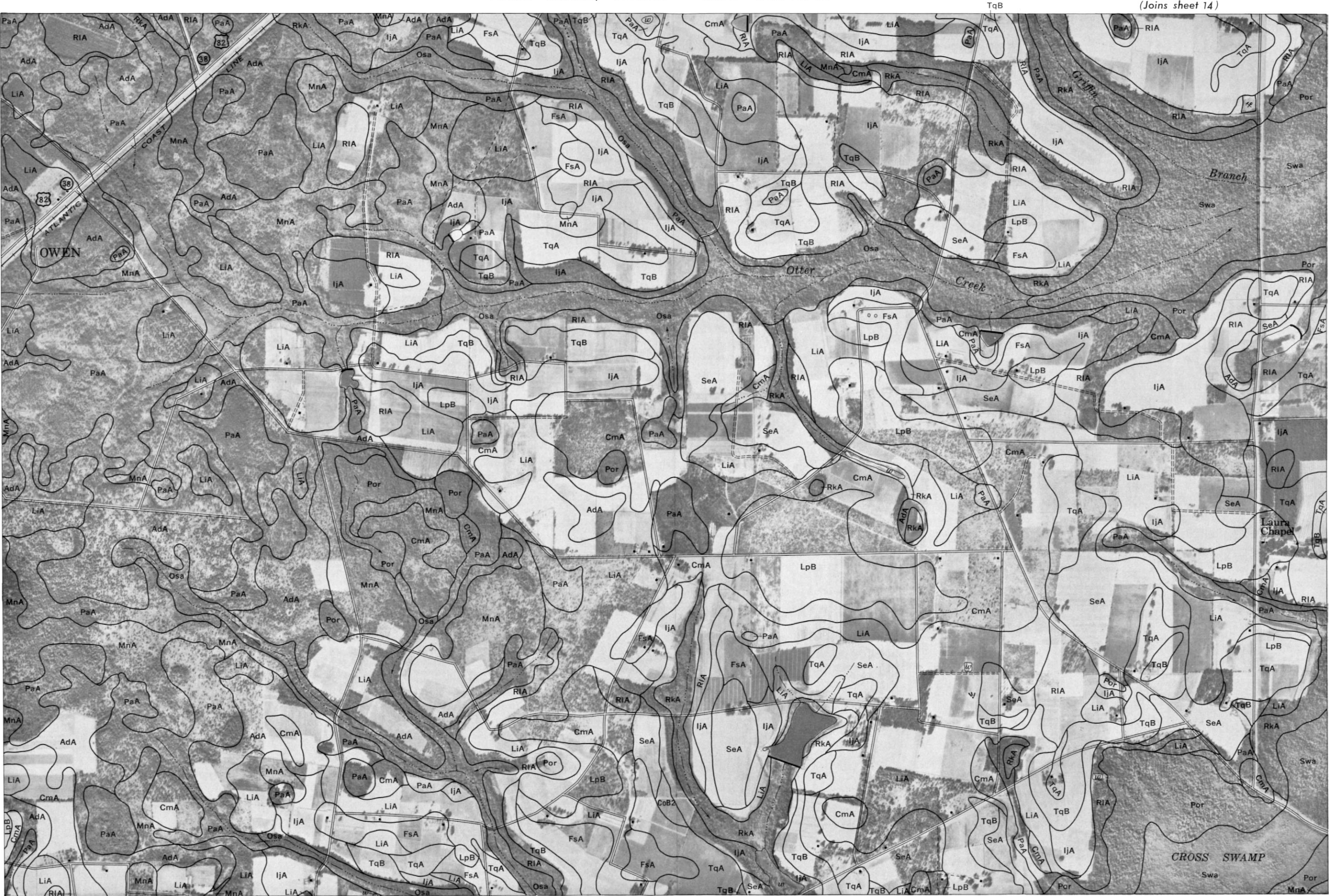
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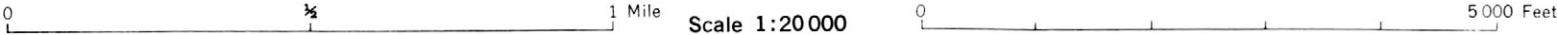
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PIERCE COUNTY, GEORGIA NO. 19

(Joins sheet 18)



(Joins sheet 20)

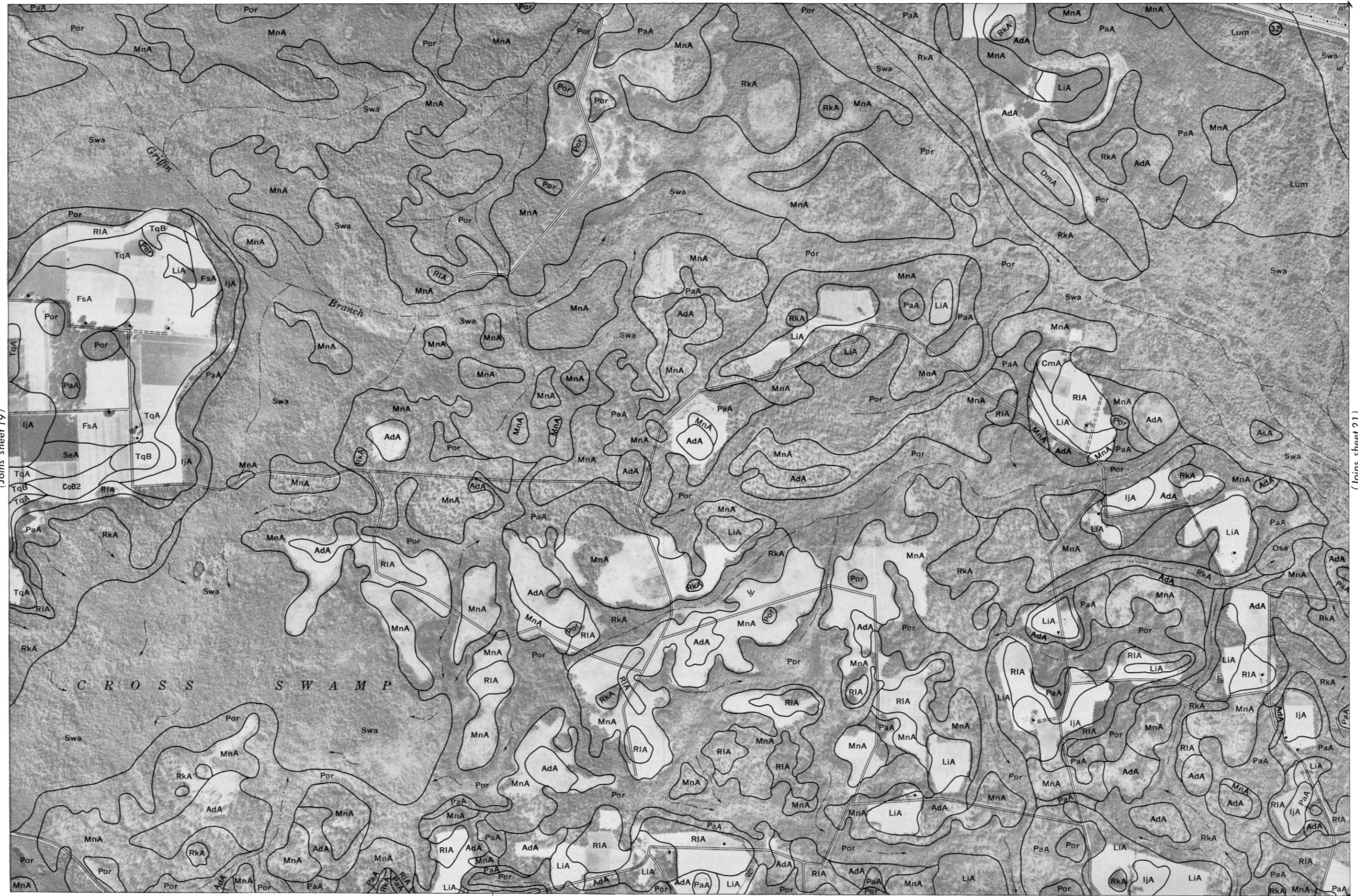


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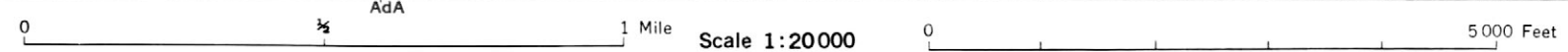
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(Joins sheet 19)



(Joins sheet 25)



(Joins sheet 21)

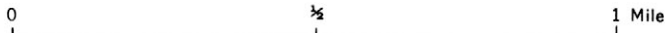
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Georgia College of Agricultural Experiment Stations.

PIERCE COUNTY, GEORGIA NO. 21

(Joins sheet 20)



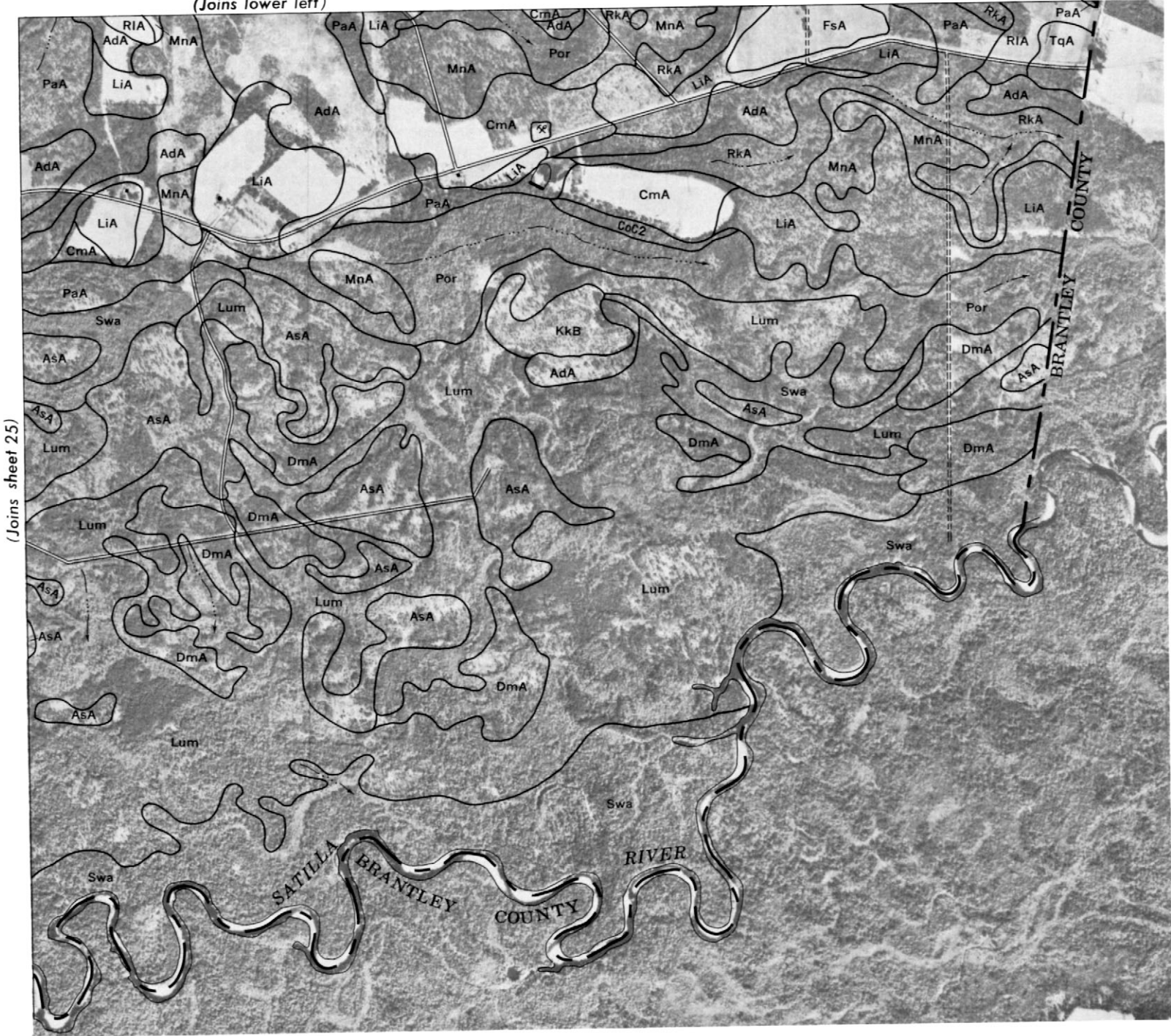
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Scale 1:20000



(Joins lower left)



(Joins sheet 25)



(Joins sheet 17)

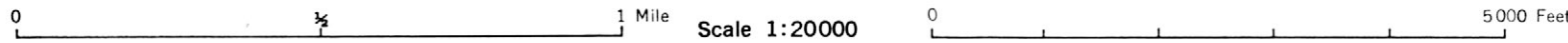


(Joins inset, sheet 16)

(Joins sheet 23)



(Joins sheet 26)





(Joins sheet 22)

(Joins sheet 24)

0 1/2 1 Mile

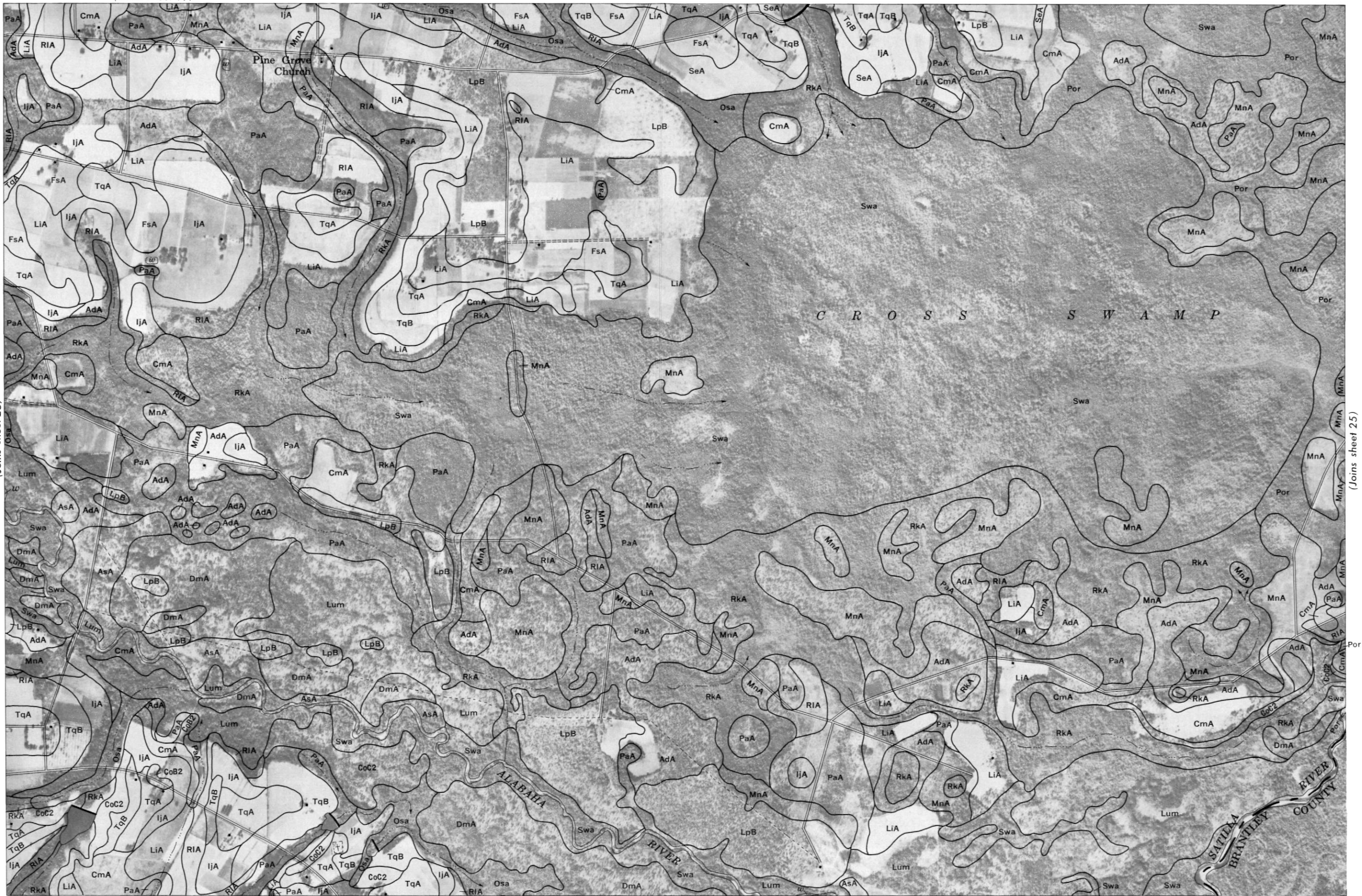
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0 5000 Feet

(Joins sheet 27)

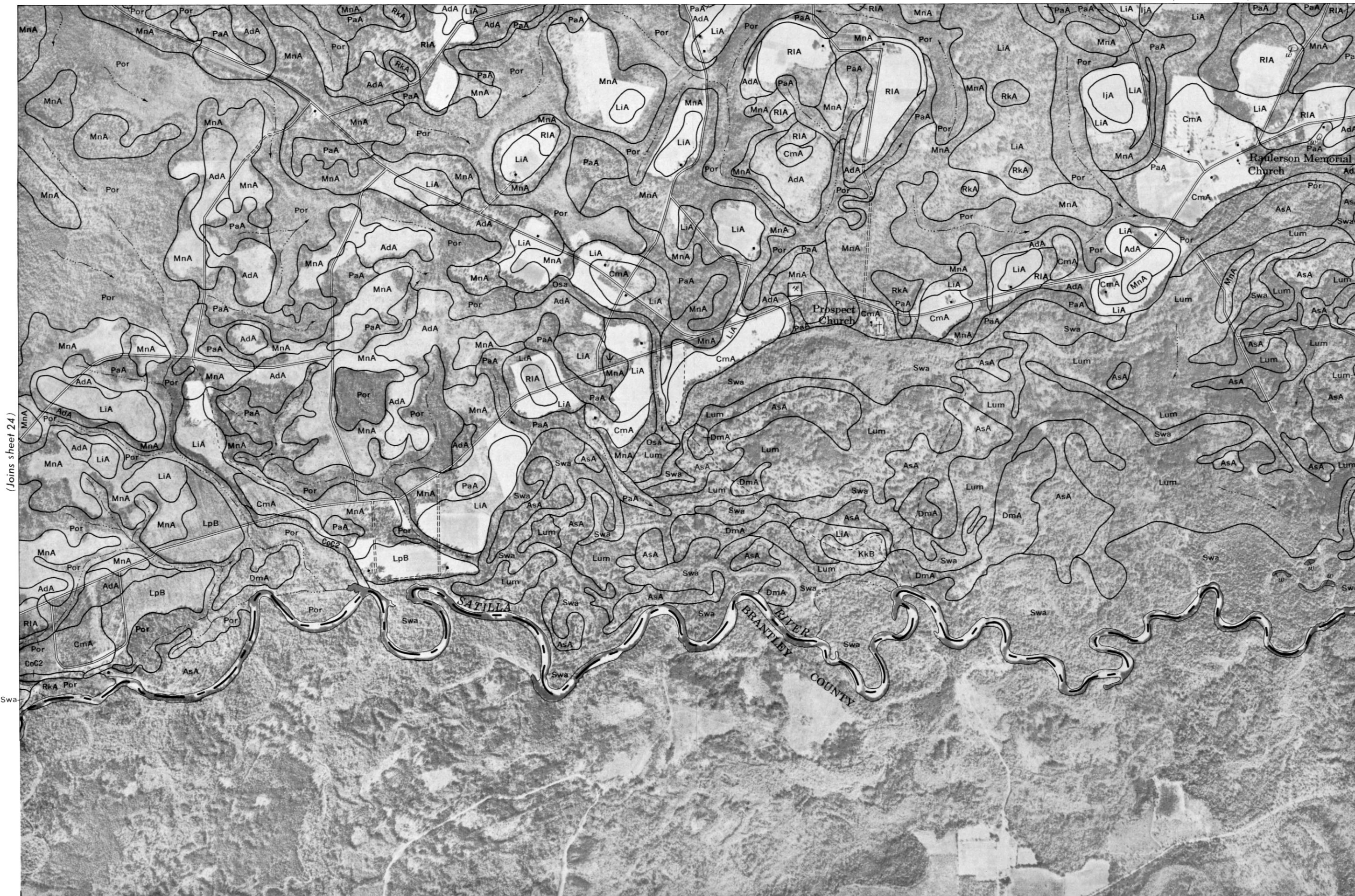


(Joins sheet 23)



(Joins sheet 28)

0 1/2 1 Mile Scale 1:20000 0 5000 Feet



(Joins sheet 24)

(Joins inset, sheet 21)

0 1/2 1 Mile

Scale 1:20 000

0 5000 Feet



(Joins sheet 27)



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PIERCE COUNTY, GEORGIA NO. 27

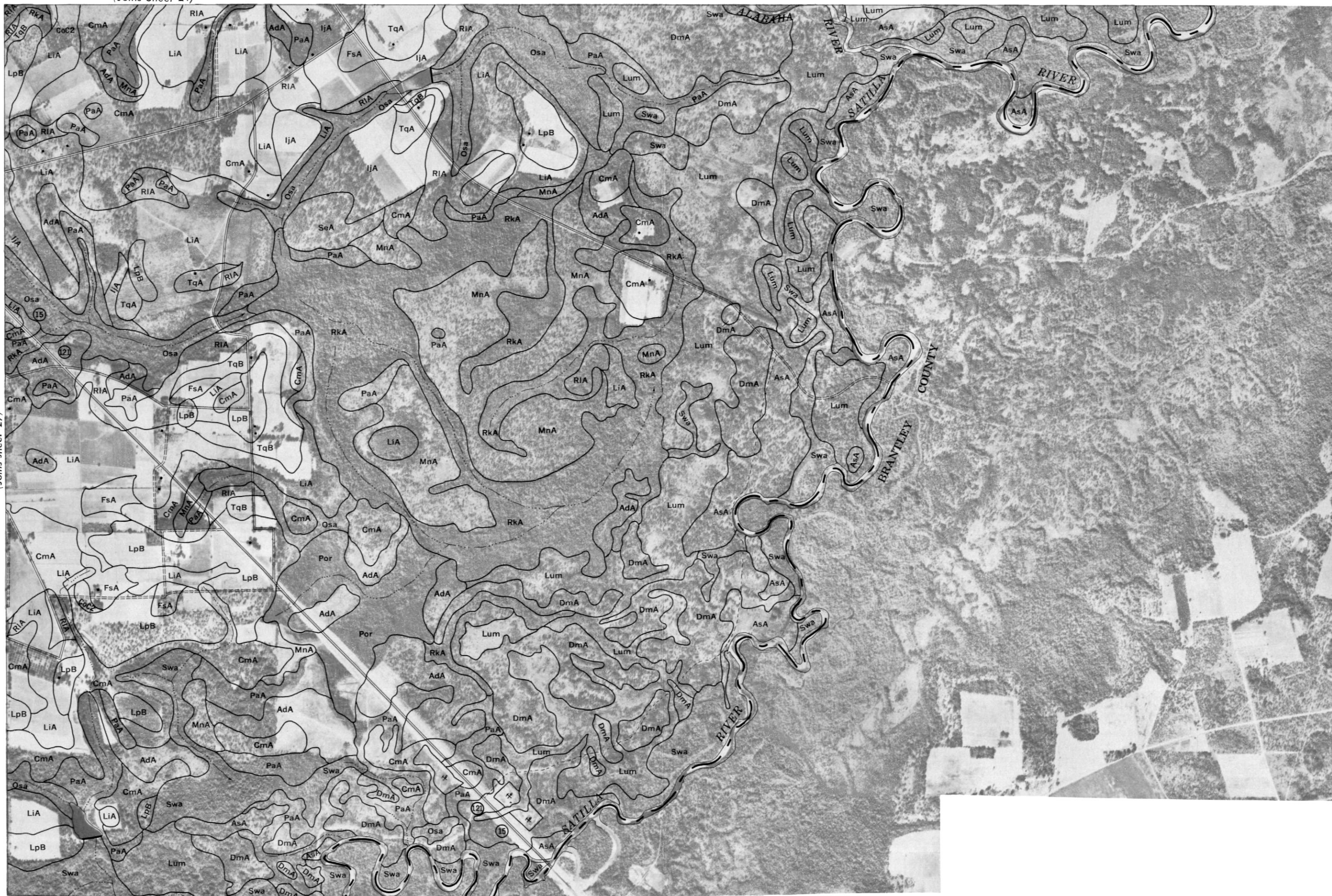
(Joins sheet 26)



(Joins sheet 28)



(Joins sheet 27)



(Joins sheet 29)

0 1 Mile Scale 1:20 000 0 5000 Feet

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PIERCE COUNTY, GEORGIA NO. 29

